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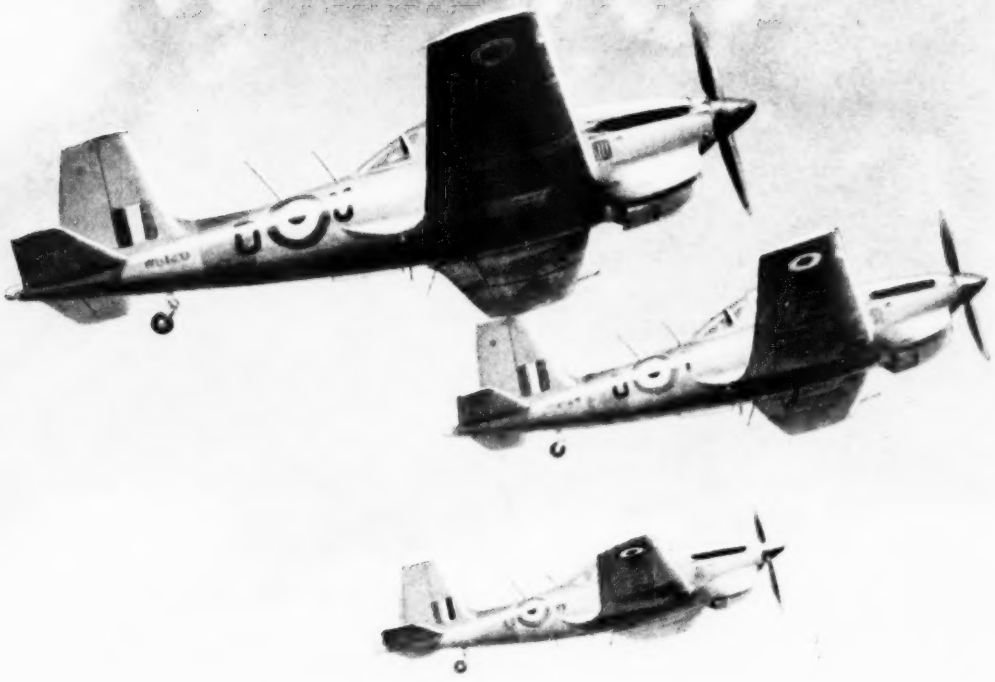

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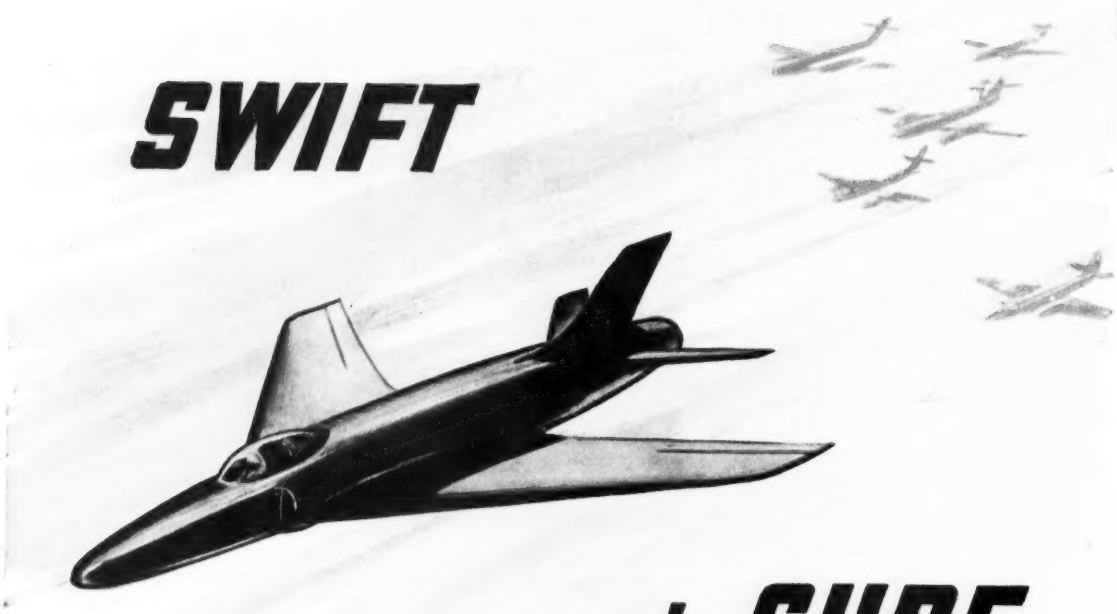

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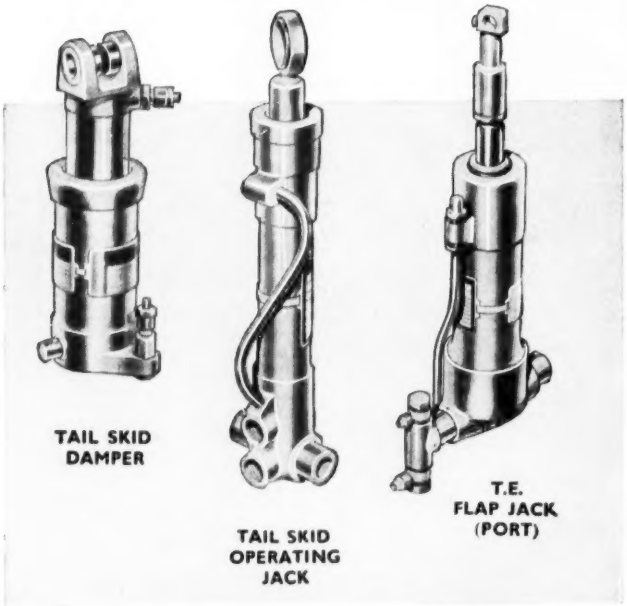

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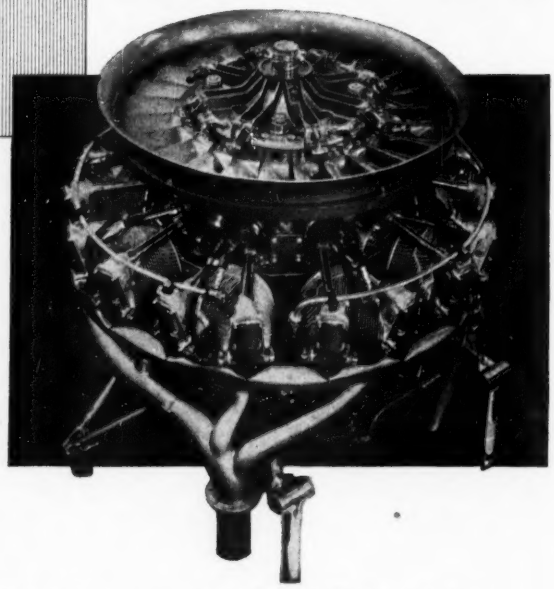

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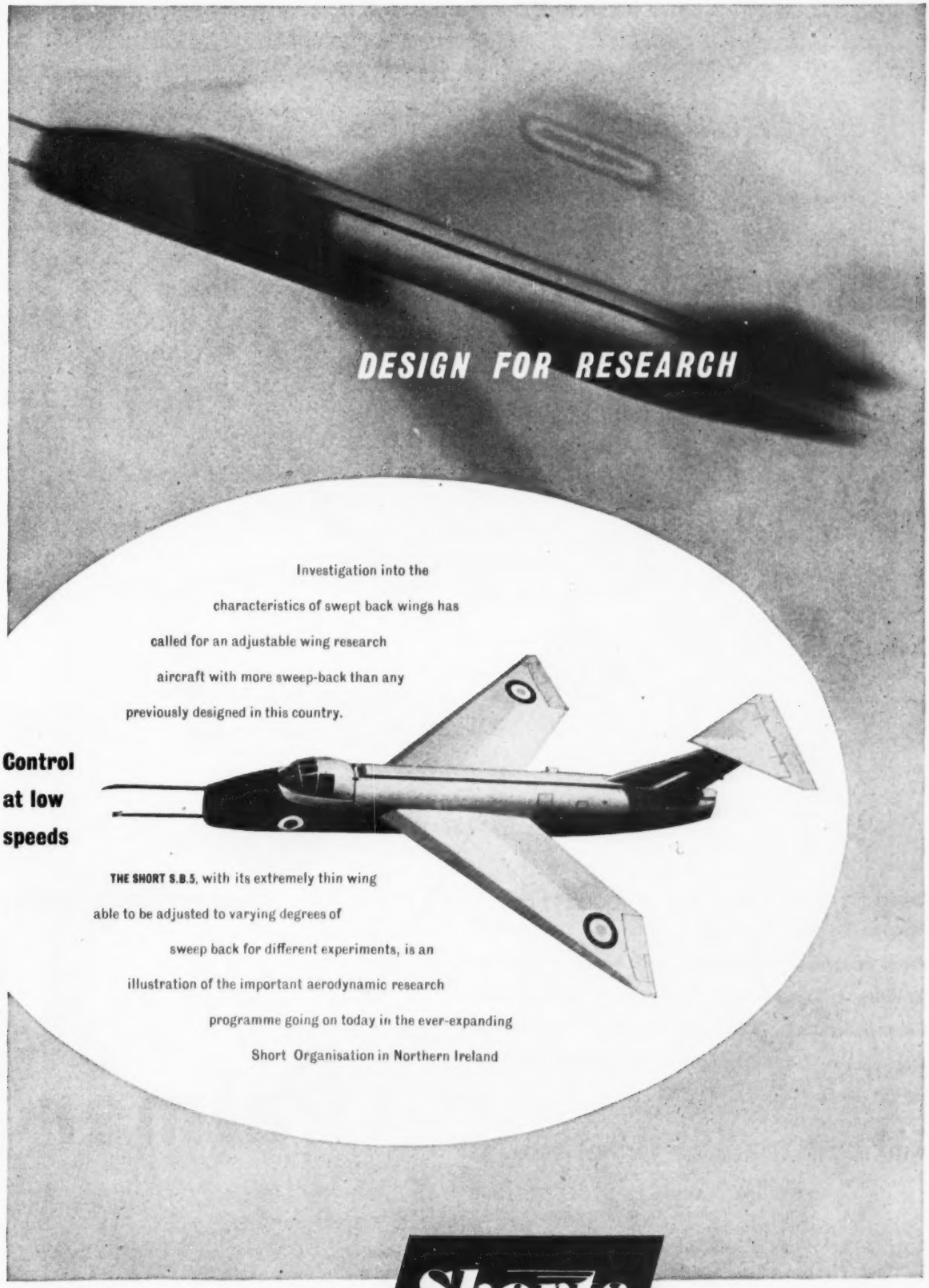

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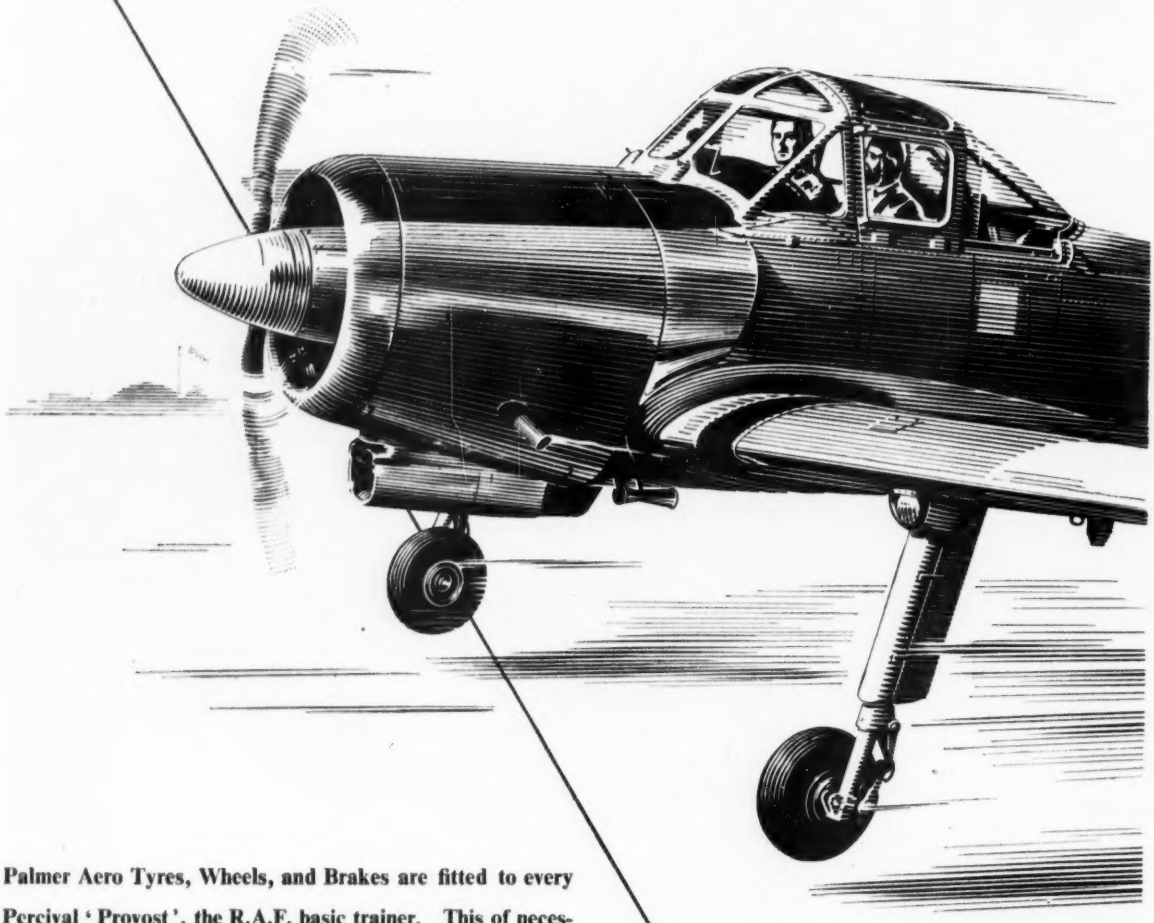

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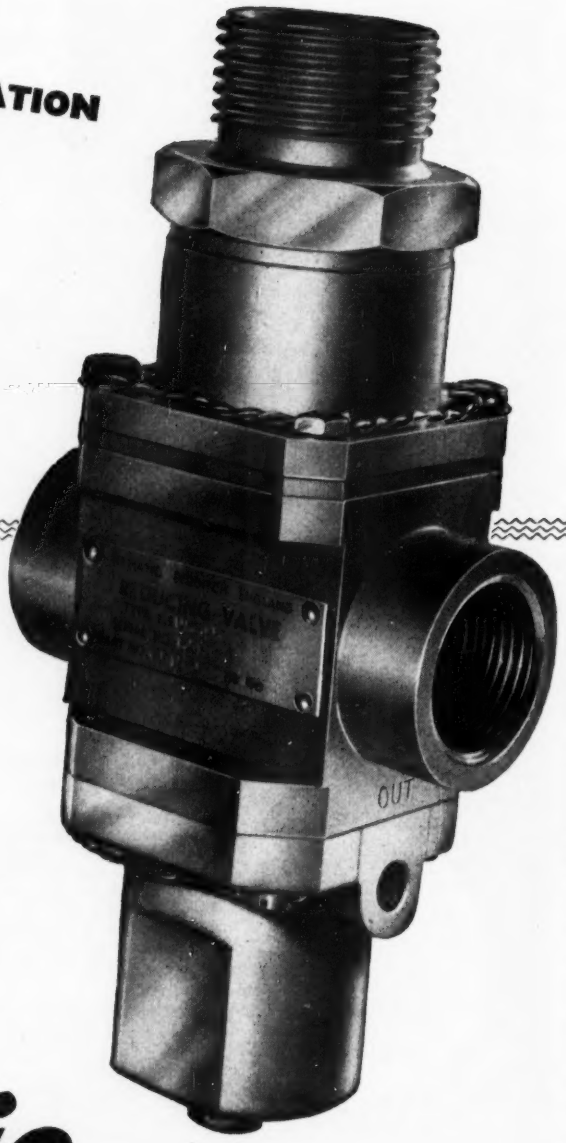

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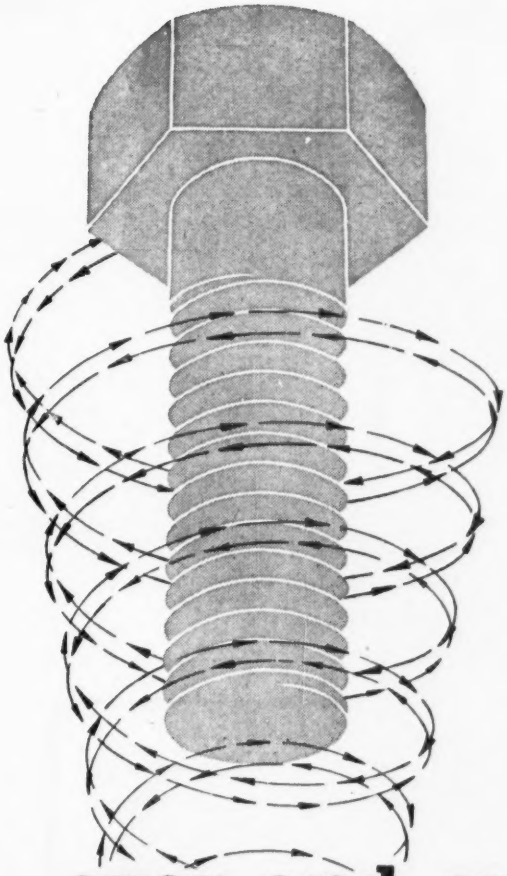

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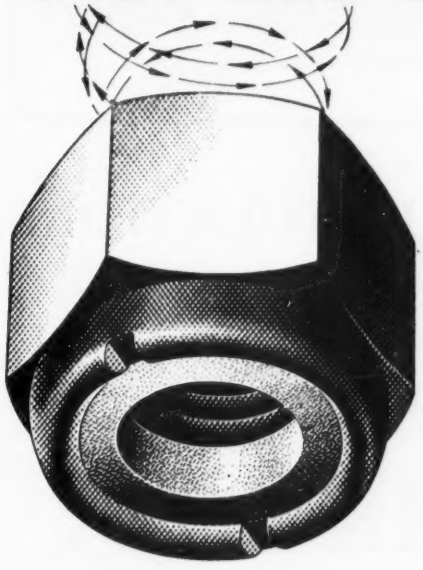

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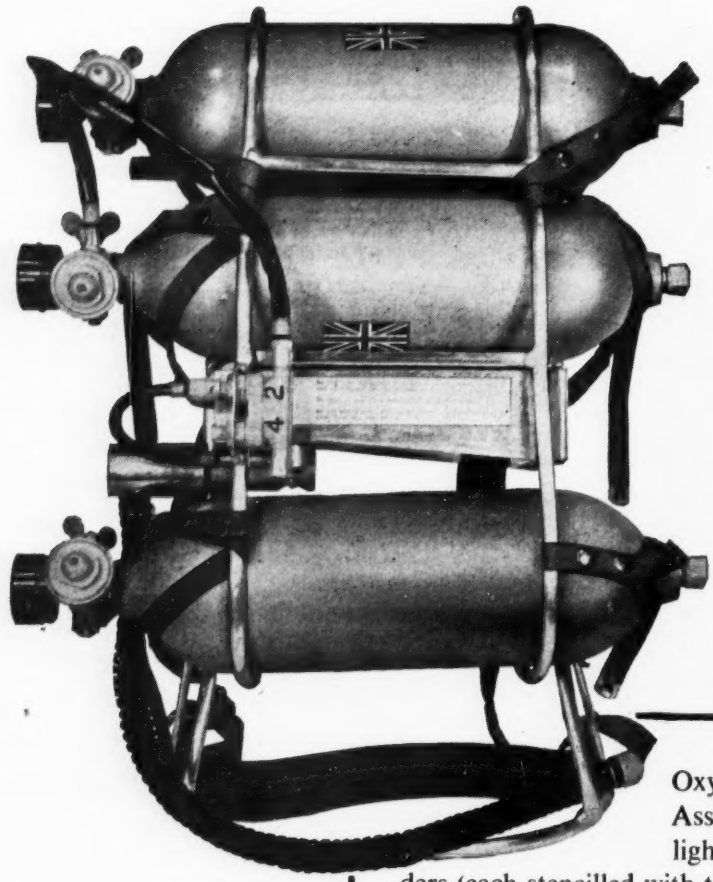

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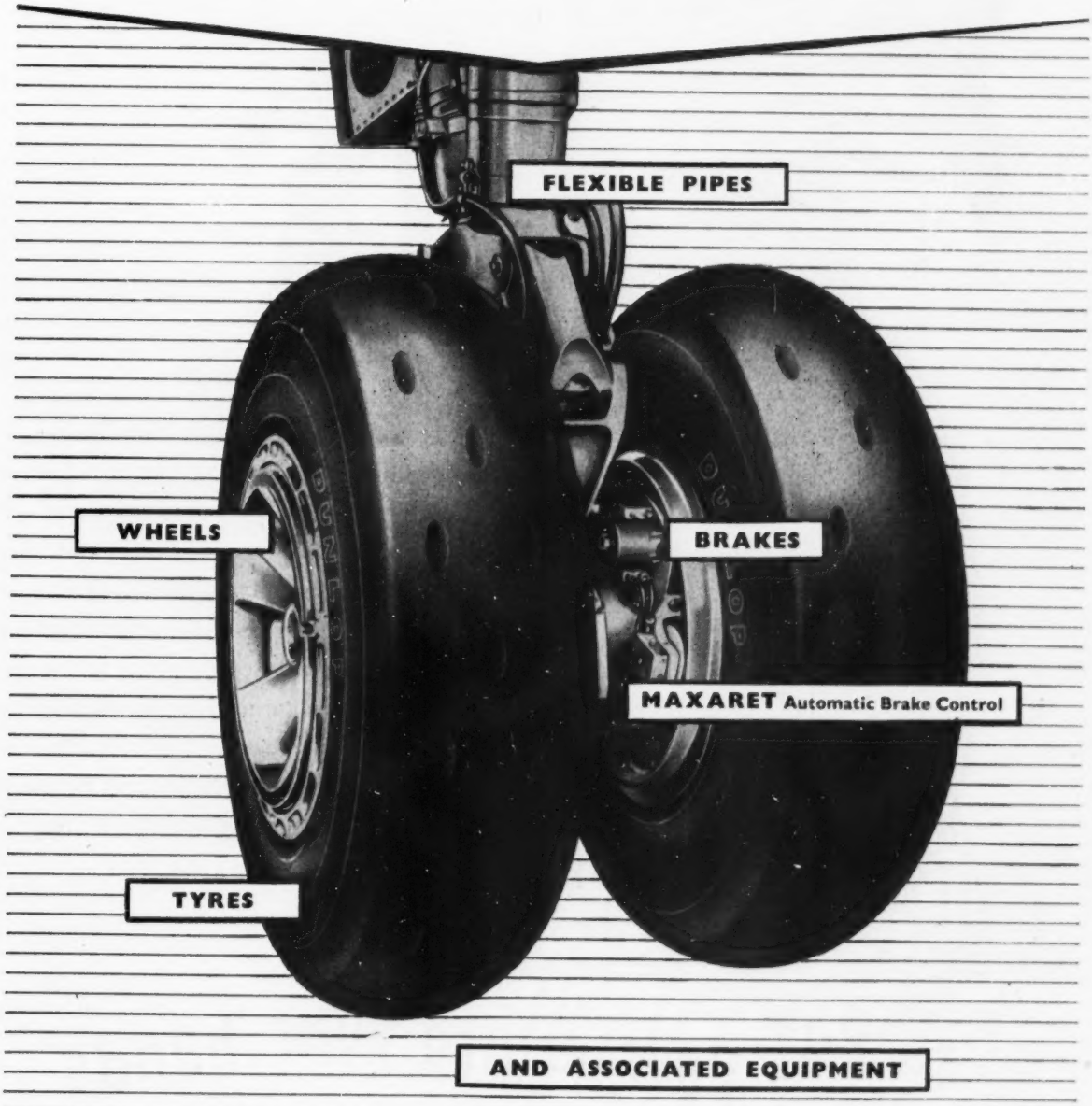

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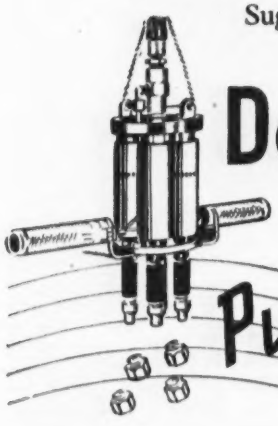

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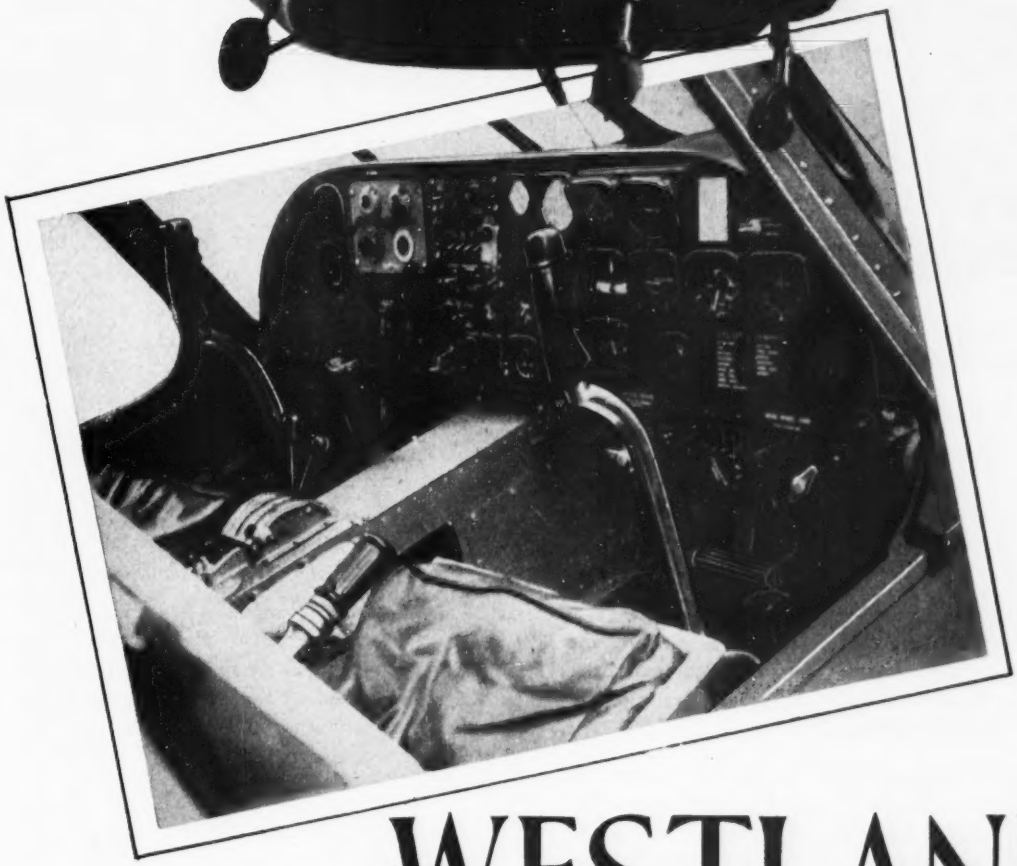

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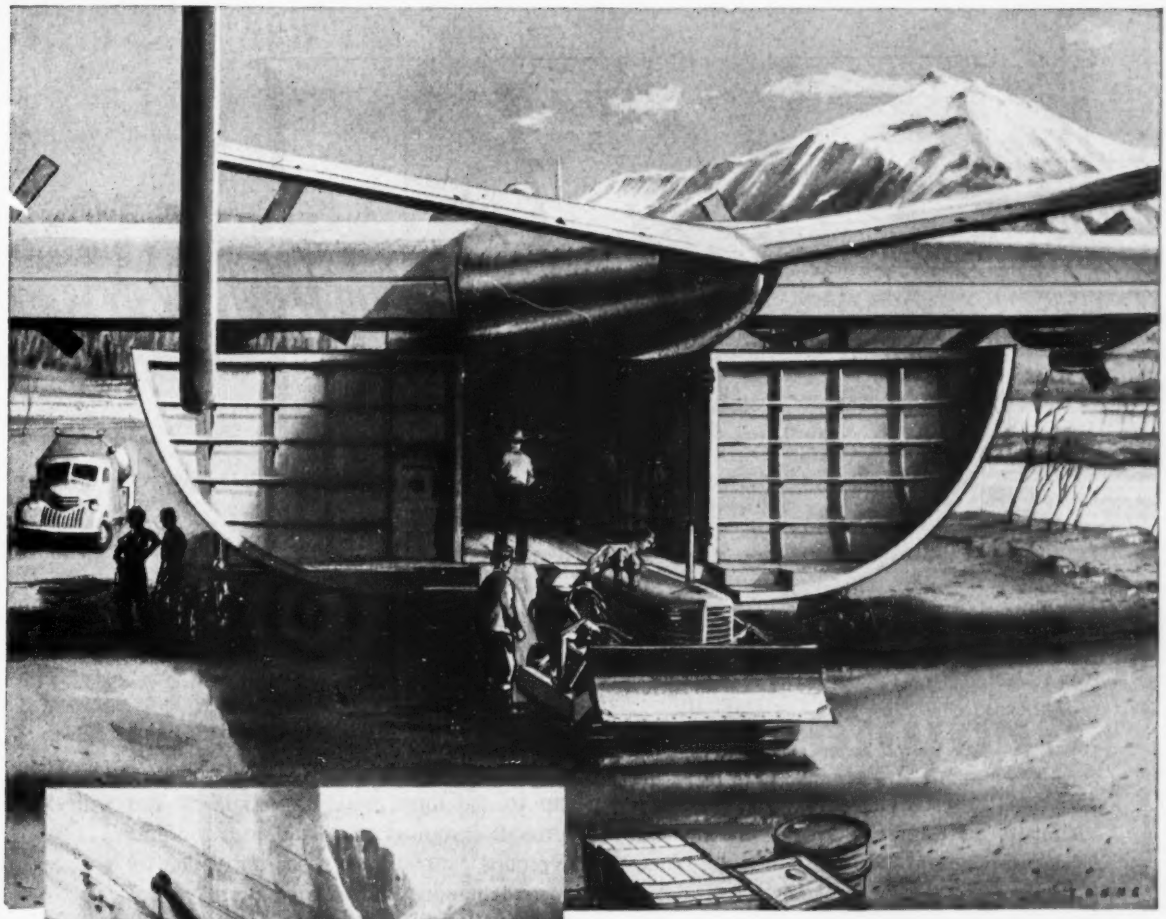

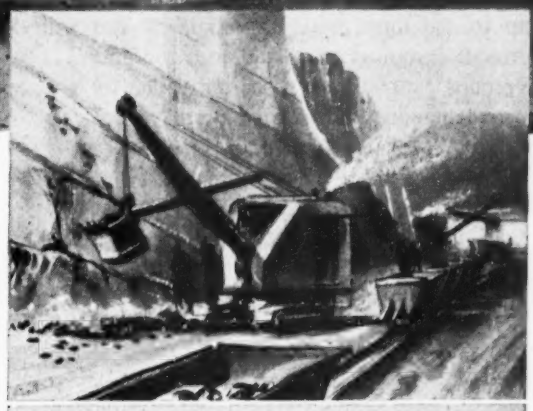

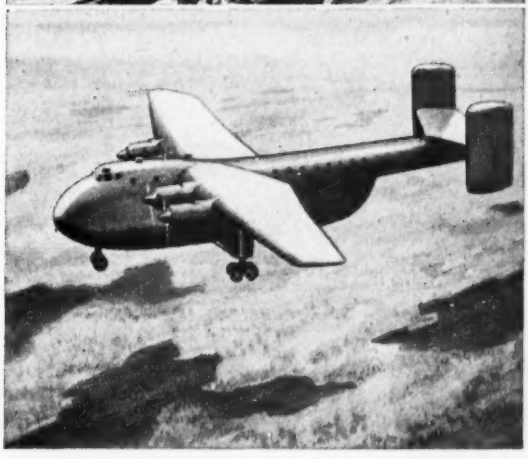

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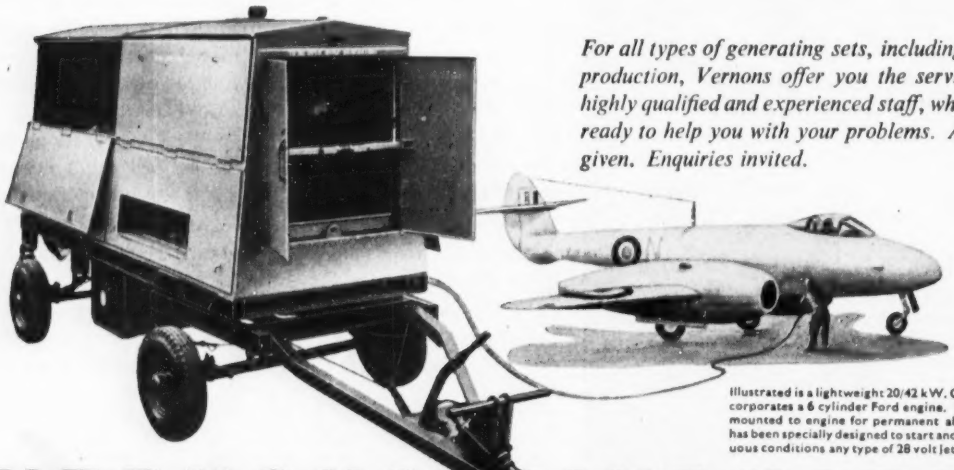

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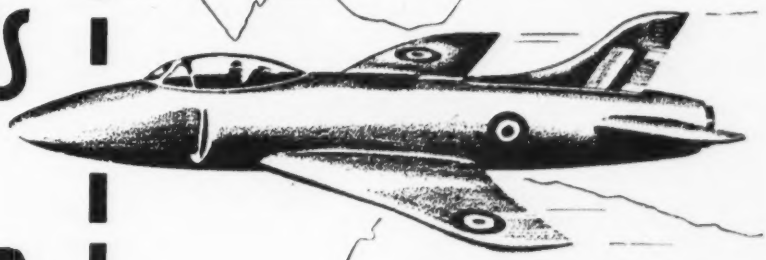

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Founded 1909

No. 2320 Vol. LXIV. FRIDAY, 10 JULY 1953

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Rich Fare in Paris

IF readers who were kept from Le Bourget last Sunday by circumstances of time or place, or simply by franc-lack, will try to visualize a sort of S.B.A.C. Show-*cum*-Air Force Display, continuing almost without interruption for over four hours in glorious weather and with Parisian gaiety, they may form a vague conception of a brilliant occasion. And brilliant is the word. The sun neither smiled nor beamed; he positively guffawed above the sprawling solid-packed enclosures. As for the demonstrating aircraft, a number of them were not merely interesting: they were thrilling. And any hitches there may have been were of little consequence. Memorable too was the official luncheon to 3,000 or more guests in the hangar where the British-built Comets—in which the French take such pride—are housed.

All honour, then, to our French friends for their enterprise and hospitality. For their own part they showed us their latest and best. Outstanding was a research aircraft designed for supersonic speed in level flight, but which, pending the fitting of rockets, flew strongly on half the thrust of a Goblin. A second experimental type, with a liquid-fuel rocket, blasted its way skywards until even its fiercesome tail-flame was lost to view. Then there was a trio of unique twin-jet trainers; a supersonic twin-jet fighter/bomber; a jet fighter which taxied in reverse by virtue of an ingenious method of thrust deflection; and similar diverting and edifying spectacles which we describe and illustrate in the following pages.

In face of such a worthy national representation, we naturally kept a sharp eye on Britain's own showing; and what we saw caused us no shame and little disappointment. Beamont, Duke, Lithgow; Canberra, Hunter, Swift; English Electric, Hawker, Supermarine—these were the names identified by the crowds with flying performance of an altogether exceptional order. These can be briefly stated as: intimate, Moth-like, aerobatics in a jet bomber; breathless speed demonstrated "on the deck"; and London-Paris-London in 38 min 20 sec.

That France's brilliant best was outshone by our own "Bea," Neville and "Mike" is quite beyond dispute, and to the flying skill of these pilots, as much as to the quality of their mounts, must go the credit for the supreme demonstrations of a wonderful day's flying.

Fit for the Queen

A VERY large proportion of the activities and interests of this journal are directly or indirectly bound up with the Royal Air Force, and for us the Royal Review by the Queen at Odiham next Wednesday could not be a greater occasion were we all still in blue and taking an active part in the ceremonies and flying. As we ourselves have already observed, there is not a man or woman among the thousands now making preparations at Odiham who is not keyed up and on his or her toes in anticipation of the historic occasion.

All Britons will feel a sense of pride on this day as they did when the Royal Navy was assembled for the Queen a few weeks ago; never were the roads and coastlines of Hampshire and Wight so packed. But, as we have remarked before, it is a sad thing that so few will be able to see the Air Force on its proudest day. Odiham is a fine station, but if its approaches are inadequate another might have been more suitable. We have an idea why arrangements have been made for Her Majesty to travel by rail and road, but we would have thought it more appropriate for her to arrive in an aircraft of the Queen's Flight. And will Odiham's Mess have been made splendid enough for the luncheon? A coat of paint and a new carpet are enough for a Minister or a Marshal; something more, we feel, is appropriate to a visit by Her Majesty.

About one thing we have no doubts: that the men, the great assembly and fly-past of aircraft and the ground equipment will look magnificent. They will be something the like of which has never been seen before. We wish the Royal Air Force sunshine and good fortune on this memorable day and in the future.

As in so many earlier Salons, the French Tricolour motif was prominent; on the left, it forms a huge roundel above the main entrance. On the opposite page are the Curtiss-Wright Sapphire and (far right) Turbomeca Marcadau, the latter being described on p. 69.

"FLIGHT" PHOTOGRAPHS

THE WEEK AT THE SALON

Little in the Air, but Plenty in the Static Show

LAST week we presented our first report upon the Twentieth Salon d'Aéronautique, which came to an end last Sunday, July 5th. The culminating displays, of impressive scope and execution, are dealt with in the central pages of this issue. Here we report on the sporadic flying at Le Bourget during the weekdays, and give our first considered summary—which is devoted to engine exhibits—of the Static Show.

On Tuesday, June 30th, the stalky Hurel Dubois H.D.31 gave two demonstration flights (we hope to print some "passenger impressions" in an early issue), and while it was taking off—in an incredibly short distance—Le Bourget was subjected to a triumphant beat-up by S.N C.A.S.O.'s very swept Model 4050 Vautour, which had that day exceeded Mach 1 for the first time. This was at Mélun-Villaroche, and another distant bang was heard during the afternoon, emanating from Rozanoff's Mystère IV.

But the highlight of the day was provided by F/O. Gannier, R.C.A.F., whose gaily-painted Canadair Sabre we had seen at Gros Tenquin—near Metz—only a fortnight before. One of the resident squadrons there is No. 430 Silver Fox and, although "bangs" are forbidden while "at work," all the pilots know just how it should be done.

After climbing to about 40,000ft he made one run, but "I had overshot," he said—and tried again. Thousands of French eyes watched the tiny trail—and Sabre—until it was vertically above them. Then down Gannier went, with his gunsight squarely on Le Bourget, and back on a reciprocal. His dive was over in four seconds—"I pulled plenty of g"—and was soon followed by an agreeable concussion.

For most spectators it was the first they had heard. Over the public address loudspeakers, Robert Roux screamed "le mur du son est franchi," and it certainly was. Gannier then put on a typically smoky Sabre show, and he was fêted when he got back to his parking place.

The following day was comparatively quiet—the Swift, Hunter and Avro 707 were all expected on this day, but still couldn't make it. But a new arrival in the static park was a mighty white Shackleton MR.2, flown in that morning by Johnny Baker. Further British flag-showing was done by Bristol's Sycamore, while a Mystère—Rozanoff up—gave visitors another opportunity of hearing a French bang. Other performers during the week were the Cessna 170, Safir, Sipa 200, Grognard, Mistral, and the C-119C Packet from Rhein-Main.

The regular visitor to Paris Salons d'Aéronautique cannot fail to notice an unusual number of changes in this twentieth show. The most obvious, of course, are the change in venue and an accompanying air of informality—reflected in the absence of the French President from the opening ceremony for the first time since 1909.

But these are possibly superficial changes. Of more lasting consequence is the altered character of the exhibition itself. No other major aircraft industry has passed through such trying times as has that of France. From 1940 it suffered four years of design sterility and enforced production to German specifications. This has now been followed by nine years of rebuilding both factories and design staffs, and in once more reaching a major place among the aircraft building nations.

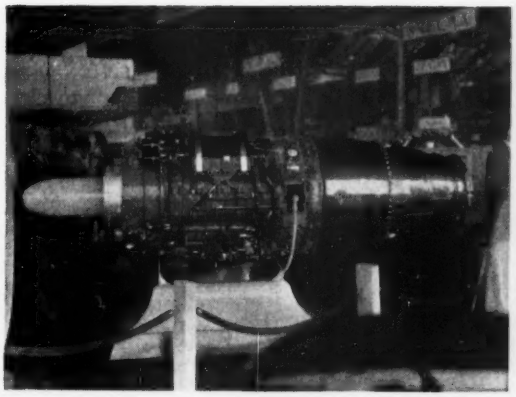
In this work the French have been severely handicapped by several fundamentals, chief of which appear to be the low level of salaries—so that there can be no question of attracting brilliant men from other countries—and the absence of intelligent governmental co-ordination of the kind so happily practised by our own Ministry of Supply. Aircraft production, too, has been handicapped by lack of finance and lack of skilled labour. Today, however, the French labour force has reached about 60,000 in the combined airframe and engine industries.

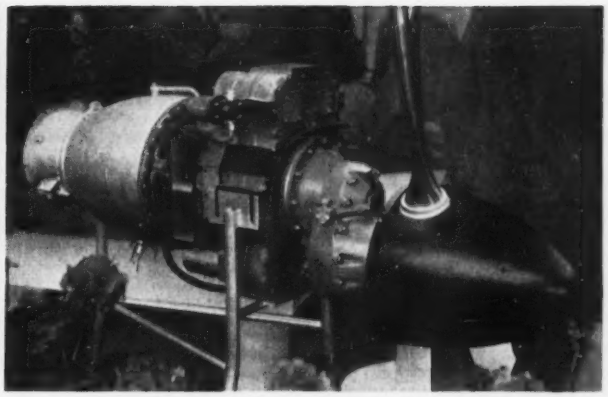
Anyway, the industry has tried hard, and posterity may justifiably look upon this year as that in which the French aircraft industry began to reap a worthwhile harvest. To some degree—as rapidly becomes obvious to the visitor to the Salon—this has been achieved by the licence-production of a great range of equipment designed, and fully developed, outside France. The great majority of such equipment is British.

Additional to this production of immediately usable equipment is a marked increase in the volume of purely French output likely to see large-scale service. This is partly explained by the policy of NATO which, with the financial assistance of the United States, aims at keeping European defence industry in a more prosperous and self-sufficient condition than has hitherto been possible; but we believe that most of the credit must go to the hard-working French industry itself, which is undoubtedly turning out some good stuff.

Last week we highlighted some of the more noteworthy static exhibits; below is a considered account of the engines displayed; and next week we shall give a similar account of the various types of accessories on show. In conformity with the policy of the S.B.A.C., little was shown by the British aircraft industry that had not been seen before. But among the foreign exhibits some were clearly of the greatest consequence, and we consider it worthwhile dealing with these at some length.

Alfa-Romeo.—This famous company exhibited on the stand of the Italian A.I.A. group. Models of the Types 110, 115 and 121 piston engines were shown—all well known—and we learned on





their stand that the company is now tooling-up for the production of an unspecified axial turbojet which, bearing in mind NATO ideas, may be the Avon, Sapphire or afterburning General Electric J47.

Armstrong Siddeley.—The Hawker Siddeley Group engine-maker filled the end of the Group stand with three examples of their superb exhibition power-plants finished in olive green and chromium plate. These were the Sapphire, Double Mamba and Snarler, which drew an interested crowd. One new figure placarded was the specific fuel-consumption of the Sapphire in a typical cruise condition, which was 0.85. The tiny Viper, of the same family, was shown on the stand of Marcel Dassault. Avro Canada did not exhibit an engine, but one heard rumours of an Orenda successor—the Waconda—upon which development has been proceeding for many months.

Bristol.—M. Pléven, the French Defence Minister, is reported to have said that he had never seen a finer exhibit than the sectioned Proteus Series 600 turboprop with which visitors to the last Farnborough Show will be familiar. Vying with it were the similarly treated Hercules and Centaurus, and the Exhibition Olympus was also shown although, of course, not sectioned. The true worth of Bristol design was vividly underlined by the latter engine, which was distinctly smaller than many other less-powerful engines in the Salon.

Curtiss-Wright.—Of exceptional interest were the Wright Turbo-Compound and Sapphire. The latter was shown next to the British Sapphire and, although a special show engine, it was not finished in the same manner as the ASSa 6. This was just as well, in that it enabled the observer to get a fair idea of the American engine which, we were told, was built of 100 per cent American parts. It was, in fact, one of the pre-production YJ65-W-1s, and showed some of the differences consequent upon the Americanization of the basic design.

The centre-bearing support, one of the most fundamental parts of the engine, is now fabricated from nodular iron sheet, made up into a high-precision welded assembly. Steel blading is used in the compressor, and Titeflex hosing carries the wide-cut gasoline fuel to the 36 burners; the latter appears strange, for both ends of each hose are firmly anchored and the British Sapphire uses rigid pipe. The J65 has an unusually long and thin nose-cap beneath which is the massive Bendix electric starter—another strange choice, which must carry a severe weight penalty.

The Turbo-Compound was shown fully sectioned. This is a very highly-developed Cyclone 3350 fitted with three blow-down power-recovery turbines. Each turbine absorbs exhaust energy which it passes to the crankshaft *via* fluid clutches. Careful re-design now gives these clutches a vortex, flushing action, which has overcome oil sedimentation problems. High-temperature cracking and blade growth is also under control. The civil R3350 features fuel injection and the Turbo-Compound retains this feature with lightweight steel pumps. The engine runs quietly with its three-stack exhausts, as we were able to judge for ourselves when the first Super Constellation to be seen in Europe landed during the Salon.

Dassault.—This prosperous aircraft company has entered the engine field with a licence from Armstrong Siddeley for the production of the Viper. The Dassault Viper, or M.D.30, should be in full production by this time next year, for it is one of the easiest of engines to build. Dassault have a number of applications for it including, of course, a light fighter. In the meanwhile, they displayed Armstrong Siddeley's show-Viper.

de Havilland.—The only engine exhibited by D.H. was a civil Ghost 50 of the type used in the Comet; this engine is now not representative of the Comet 1a as used by the French, but it serves well to give people an idea of the excellent ruggedness and simplicity which has been obtained. In passing, we may record that we heard one very American visitor asking if de Havillands had "any brochures on the Gyron."

Fiat.—This company have for long overhauled D.H. Goblins and they now have a completely new plant at Lingotto where they are building the Ghost. Known as Fiat Ghost 48 Mk 1, this engine will principally be used in the French- and Italian-built Venoms and Sea Venoms. No complete engine was displayed, but a colour film showed production at Lingotto and a company spokesman said that Fiats would shortly go axial, probably with the J47-GE-17 for the Italian-built all-weather Sabre.

Flygmotor.—Another Ghost licencee, Flygmotor make the single-entry version for the J-29 fighter, of which large numbers are now in service. Bifurcated Ghosts will also pass through Flygmotor shops for the Venoms, but these will be British built, at least in the first instance.

An array of production Ghost components was shown to illustrate the high standard of general finish. A Lucas fuel pump was also exhibited of the type for which Flygmotor hold a production licence, and an attractive model showed the company's ballistic and power-plant laboratory. But the most interesting exhibit was an array of components for an afterburner fuel system.

The centrifugal fuel pump is air-driven by a bleed from the main engine compressor and the whole arrangement is controlled by a very complete electro-pneumatic-hydraulic system based upon the pressure ratio across the main turbine. Overheating or surging is countered by variation in fuel flow and eyelid position to permit the automatic selection of engine power by movement of the single pilot's throttle lever. From switching on, full afterburner power is claimed in 1.5 seconds. The total weight of the system is 36.9 lb and the pump—which gives up to 2,500 gal/hr at 850 lb/sq in—completed a 100-hr type-test last November, and the complete arrangement has now amassed a total of 300 hours running.

Hispano-Suiza.—As we noted last week, the dominating exhibit here was the R.450 Verdon. The name, incidentally, perpetuates the Rolls-Royce "River series" of gas turbines, for the Verdon is a swift-flowing river in the South of France. Basically, the engine is the Hispano Tay with a vast afterburner entirely developed by the company.

Although of excessive bulk, this afterburner shows careful design. Re-heat fuel is supplied by a radial-flow turbo-pump driven by air tapped from the compressor. Compressor air is also supplied to the jacks which actuate the two-position eyelids, the whole being under single-lever, electro-magnetic control. A blanking cap prevented the many burners from being seen, but they appeared to be at the end of the lengthy diffuser section.

With full re-heat, a thrust gain of 35 per cent (to a total of 9,920 lb) is claimed at sea level, the fuel flow being doubled; "in flight at M = 1.5" the thrust gain is quoted as 91 per cent for a fuel penalty of but 38 per cent. The Verdon has been test-flown mounted above a Languedoc and in a special Ouragan, and is going into production for the Mystère.

The Verdon itself has come a long way since the basic Tay engine was discarded by the M.o.S. Less than a month ago the Tay 253 was tested at 7,720 lb thrust and this power plant will go into production this summer for Ouragans and Mystères. But Hispano-Suiza are likely to build fewer Verdons than they have Nenes—production of which exceeds 800—for they hold a licence to build the Avon, first in the RA 7 version (for the Mystère IVB) of which a Rolls-Royce demonstration model was shown. Later, they will build a powerful civil Avon for the H.D. 45 and Caravelle.

Also on the Hispano stand were a Nene 105, which now gives 5,200 lb thrust, and a Type 12Z fuel-injection vee-12 piston engine, whose "cannon firing through the hollow airscrew shaft" smacked of pre-war days. Not shown was the R.300 turbojet—a Nene development upon which work appears to have ceased.

(*Continued on page* 68)

FROM ALL QUARTERS

ROYAL FAREWELL: Shielding her eyes from the glare, the Queen watches the departure from London Airport of a B.O.A.C. Comet, bound for Southern Rhodesia with the Queen Mother and Princess Margaret as passengers. The Royal travellers were to take part in the Rhodes Centenary celebrations (see "Flight" last week). With Her Majesty and the Duke of Edinburgh are Sir John D'Albiac, the airport commandant (left), and Mr. Whitney Straight, chief executive, B.O.A.C.

SHAPE Re-shaped

AMONG the changes in structure of command recently announced by Supreme Headquarters, Allied Powers in Europe, is the appointment of Air Chief Marshal Sir Basil Embry as Commander of Allied Air Forces in Central Europe, in succession to Gen. Lauris Norstad, U.S.A.F. Marshal Juin, previously Commander-in-Chief, Allied Land Forces in Central Europe, is promoted to Commander-in-Chief of all Allied Forces in Central Europe, with subordinate land, naval, and air commanders, thus conforming to the pattern already existing in the northern and southern European commands.

The responsibilities of the Air Deputy to the Supreme Commander will be enlarged when Gen. Norstad succeeds Air Chief Marshal Sir Hugh Saunders at the end of his tour of duty next month. In addition to his duties in advising the supreme commander on air matters, the co-ordination of air defence, and the training of air forces, decisions concerning air policy, and general control over air activities, will then be General Norstad's responsibilities. He will also have operational control of any air forces, such as strategic forces, not allocated to specific subordinate commands.

Swiftly to Paris

AFTER being postponed from the preceding Wednesday by unsuitable weather, the attempt by a Supermarine Swift F.4 (Rolls-Royce Avon with reheat) on the London-Paris speed record was made—and with success—on Sunday last, July 5th. With Lt. Cdr. Michael Lithgow, Supermarine's chief test pilot, at the controls, the Swift took 19 min 5.6 sec for the trip to Paris, the average speed being 669.3 m.p.h. Later, after taking part in the air display at Le Bourget, it returned to London in 19 min 14.3 sec —at a speed of 664.3 m.p.h. The flights were made at a surprisingly low altitude—not much over 1,000ft. The previous London-Paris record was that set up by the late Trevor ("Wimpy") Wade in a Hawker P.1052 in May, 1949, at a speed of 617.87 m.p.h.

Speaking with a *Flight* representative at Le Bourget on arrival, Mr. Lithgow said that weather conditions had been good—especially at the English end. The reheat with which the Avon is fitted, he continued, was not in fact used during the outward journey.

The times of the flights, which were observed by the R.Ae.C., are subject to confirmation before they can officially rank for record purposes.

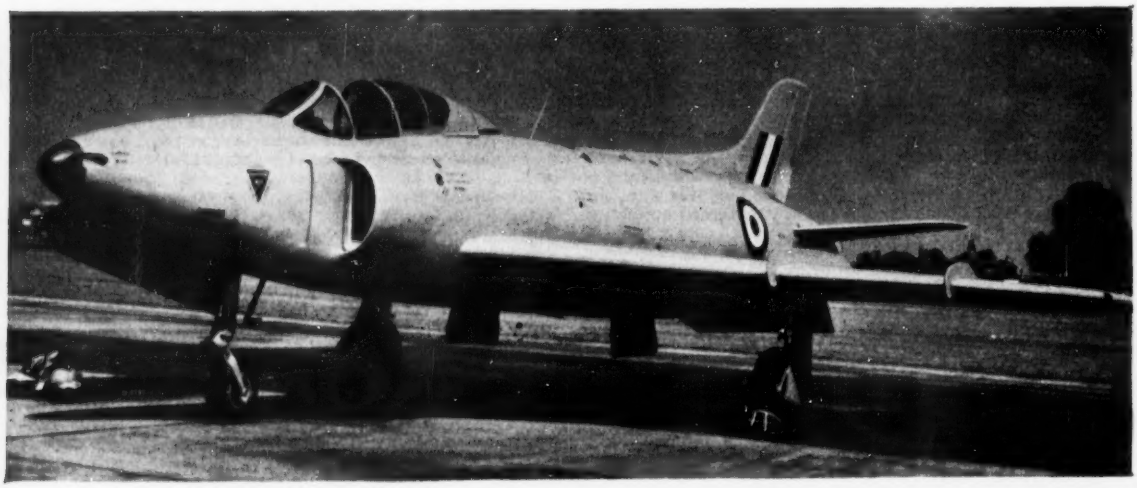
Defence College Appointment

THE Ministry of Defence has announced the appointment of Air Chief Marshal Sir Arthur P. M. Sanders as the next Commandant of the Imperial Defence College, with effect from January 1st next. He succeeds General Sir Frank Simpson.

Sir Arthur is at present C-in-C. Middle East Air Force, which post he has held since May 1952. Before that he was Deputy Chief of the Air Staff.

His place as C-in-C. M.E.A.F. is to be filled by A.V-M. C. B. R. Pelly, with effect from October and with the acting rank of air marshal.

"MIKE'S" NEW RECORD: Supermarine's Lt. Cdr. M. J. Lithgow (upper right) and the blue Swift F.4 (Rolls-Royce Avon) in which he made his London-Paris-London record flight, recorded on this page. The Swift has four wing-fences.



G/C. Townsend's New Post

IT was announced on July 3rd that G/C. Peter Townsend, C.V.O., D.S.O., D.F.C. and Bar, Extra Equerry to the Queen, has been appointed to the post of British Air Attaché in Brussels; he will begin his new duties in about a week's time.

Commissioned in the R.A.F. in 1935, G/C. Townsend was appointed an equerry to the Household in 1944; he was the third active-service officer selected by King George VI as an "equerry of honour." He has piloted Royal entries in several major air races.

B.C.P.A. Not to Close

A REPORT in the daily Press that British Commonwealth Pacific Airlines was to close down, and that its operations would be taken over by Qantas and Tasman Empire Airways, has been denied officially in London. "There is no indication that B.C.P.A. is closing," it is stated in a message from the company's head office.

Skyways York Inquiry

POSSIBLE causes of the loss of the Skyways York last February while on a flight from the United Kingdom to Jamaica were outlined when the public inquiry opened in London last week. The York carried 33 passengers and a crew of six, and was on charter to the War Office. Possible causes which could be eliminated, stated the Solicitor-General, Sir Reginald Manningham-Buller, Q.C., were crew error, sabotage, water in the petrol, trouble among the passengers, engine or structural failure, and metal fatigue. In view of the public anxiety, he said, it would be desirable to consider whether the use of this York on this day, with the known weather conditions, was proper.

H. C. W. Trapmore Joins Boulton Paul

CHIEF production manager of Blackburn and General Aircraft, Ltd., for the past seven years, Mr. H. C. W. Trapmore, M.I.P.E., is relinquishing that post in order to take up an appointment as production manager of Boulton Paul Aircraft, Ltd.

He began his aviation career as a Hawker apprentice in 1922, and six years later joined the Westland design-staff. In 1931 he went to Handley Page, Ltd., and during his 14 years with that company he was seconded in an advisory capacity to English Electric when they undertook Hampden and Halifax production early in the war period. He joined Blackburn Aircraft in 1945.

"BEA'S" NEW HONOUR: Wing Commander Roland Beamont, chief test pilot to the English Electric Co., Ltd., after being made O.B.E. (an honour which he now adds to his D.S.O. and bar and D.F.C. and bar) at Buckingham Palace. With him are Mrs. Beamont and daughter Carol.

"BEN'S" NEW BABY: The Boulton Paul P.111A delta-wing research aircraft (Rolls-Royce Nene) has made its first flight at Boscombe Down. The pilot was A. E. ("Ben") Gunn. Generally similar to the P.111, which preceded the ill-fated P.120, its air brakes are in four rectangular sections, equally spaced round the fuselage. A number of internal improvements, suggested by experience with the earlier model, have been incorporated. The P.111A should appear in the Society of British Aircraft Constructors Display this year.

Sir Hew Kilner Retires

THERE will be general regret throughout the industry that one of its best known personalities, Major Sir Hew Kilner, M.C., of Vickers, Ltd., and Vickers-Armstrongs, Ltd., has been compelled by ill-health to retire from the Boards of both companies.

After 1914-18 war service in the Royal Artillery he held the appointment of staff captain in the War Office for four years, and had five years' experience as an instructor in gunnery.

Maj. Sir Hew Kilner.

He joined Vickers-Armstrongs in July, 1930, and in 1931, was appointed a special director and general manager of the company's Southern Engineering Works; he became a director in 1936. In 1940, when there were increasingly heavy demands for aircraft production, he was appointed general manager of Vickers' aircraft section and since that date his main interests have been on that side of the company's business.

Sir Hew was appointed managing director (aviation) of Vickers-Armstrongs, Ltd., in 1944, and two years later became deputy chairman, while continuing his former duties. He was also appointed a director of the parent company, Vickers, Ltd., in 1945, and a director and chairman of Cooke, Troughton and Simms, Ltd., a subsidiary company, in 1952. In 1947, in recognition of his services to the nation, he was knighted.

The following appreciation, by a Vickers-Armstrongs spokesman, will give expression to the feelings of the many who have come into contact with Sir Hew Kilner during the past quarter of a century:—

"To Sir Hew must be given most of the credit for organizing and leading a team which has successfully produced Spitfires, Wellingtons, Vikings, Valettas, Varsities, Attackers, and now Swifts, Viscounts and Valiants.

"For the company to whom he has given such signal service, his retirement from active work is a severe loss both to his colleagues and to all those who worked under him; the aircraft industry has also lost an active, kindly and energetic supporter. It is the heartfelt wish of all concerned that he will regain his health and continue to give encouragement and active support to the young industry in which he is so intensely interested."

Following Sir Hew's retirement, certain changes have been made in the senior organization of the companies concerned. Maj. Gen. C. A. L. Dunphie, C.B., C.B.E., D.S.O., becomes chairman and managing director of Vickers-Armstrongs, Ltd., while Mr. R. P. H. Yapp is appointed chairman of Cooke, Troughton and Simms, Ltd. Also, the scale of the Vickers-Armstrongs business has made it necessary to increase the present two divisions to three, aircraft, engineering and shipbuilding (previously, the two last-named were combined in one). A number of new appointments have been made in executive positions in the engineering and shipbuilding divisions.

HERE AND THERE

PIECE OF CAKE—in the shape of U.S.S. "Antietam"—was presented to Lt. Cdr. D. G. Parker, R.N. (right) for making the 5,000th landing on that vessel since the new angled deck was fitted. According to U.S.N. custom, the presentation was made by the skipper, Capt. S. G. Mitchell.

Keener Edge

AMERICAN air strength in Germany will shortly be increased by the arrival of 75 F-86 Sabres of the 50th Fighter-bomber Wing. The unit, which has a strength of 1,500-1,800 men, is now completing training in New Mexico.

B.E.A. Art

PILOTS are among the B.E.A. staff who have entered some 70 pictures for the Corporation's first exhibition of paintings and drawings. The exhibition was opened at a private view on July 3rd, at Keyline House, Ruislip, by Lady Douglas of Kirtleside, wife of the B.E.A. chairman.

U.S. Carrier Planes

THE U.S. NAVY plans to build one 60,000-ton *Forrestal*-class aircraft carrier each year until ten of these are in operation. This was recently disclosed by Mr. J. Floberg, Assistant Secretary of the Navy for Air, speaking before the Appropriations Committee of the House of Representatives.

No Danish NATO Bases?

THE OBJECTION of the Danish Social Democratic Party—the biggest in the country's Parliament—to the NATO proposal to establish two wings of U.S. fighter aircraft in Denmark, was expressed in Copenhagen recently by the Party's leader, Hr. Hedtoft. He maintained that Denmark should not accept the NATO offer, and said that the stationing of Allied Air Forces in the country would not increase popular backing for the Atlantic Pact. This statement marks an important change in the Party's attitude; it had previously accepted the principle of the establishment of the NATO bases, its final consent being subject only to certain technical considerations.

Air Corridor Talks

THE four-power conference on flying in the Berlin air corridors was resumed on July 1st, at the British Headquarters in Berlin. An official communique stated that the delegates decided to entrust to the technical sub-committee the task of examining the warning signals to be exchanged between aircraft.

Wind-tunnel for Tokyo

SUPERSONIC research in Japan, suspended since the war, will be resumed shortly with the completion of a high-speed wind-tunnel at the Science and Technological Institute of Tokyo University. Said to be capable of simulating a Mach number of 3.0, the tunnel is described as a replacement for one destroyed by American occupation forces.

Cops and Rotors

REGULAR helicopter patrols of New York by the city's police began on June 25th. The flights, claimed to be the first of their type in the world, are made daily from Floyd Bennett Field, Brooklyn. The five boroughs are covered, special attention being paid to the waterfront area. In the first week of operation, a patrol "booked" a light-aircraft pilot for low flying. Details of a British experiment in the use of helicopters for police work appeared in *Flight* of June 26th.

Review Programmes

THE R.A.F. Benevolent Fund is responsible for the sale of all official programmes for the R.A.F. Review at Odiham on Wednesday next. Persons who are unable to attend, but who wish to have a souvenir of this great occasion, can obtain copies of the programme, price 3s post free, from the Headquarters of the Fund, at 67 Portland Place, London W.1.

Amendment from America

FROM our American correspondent comes an amendment to his column published on page 810 of the issue of June 26th. His reference to Capt. Rickenbacker's interview, he says, should have specified *American Aviation*, and not another journal.

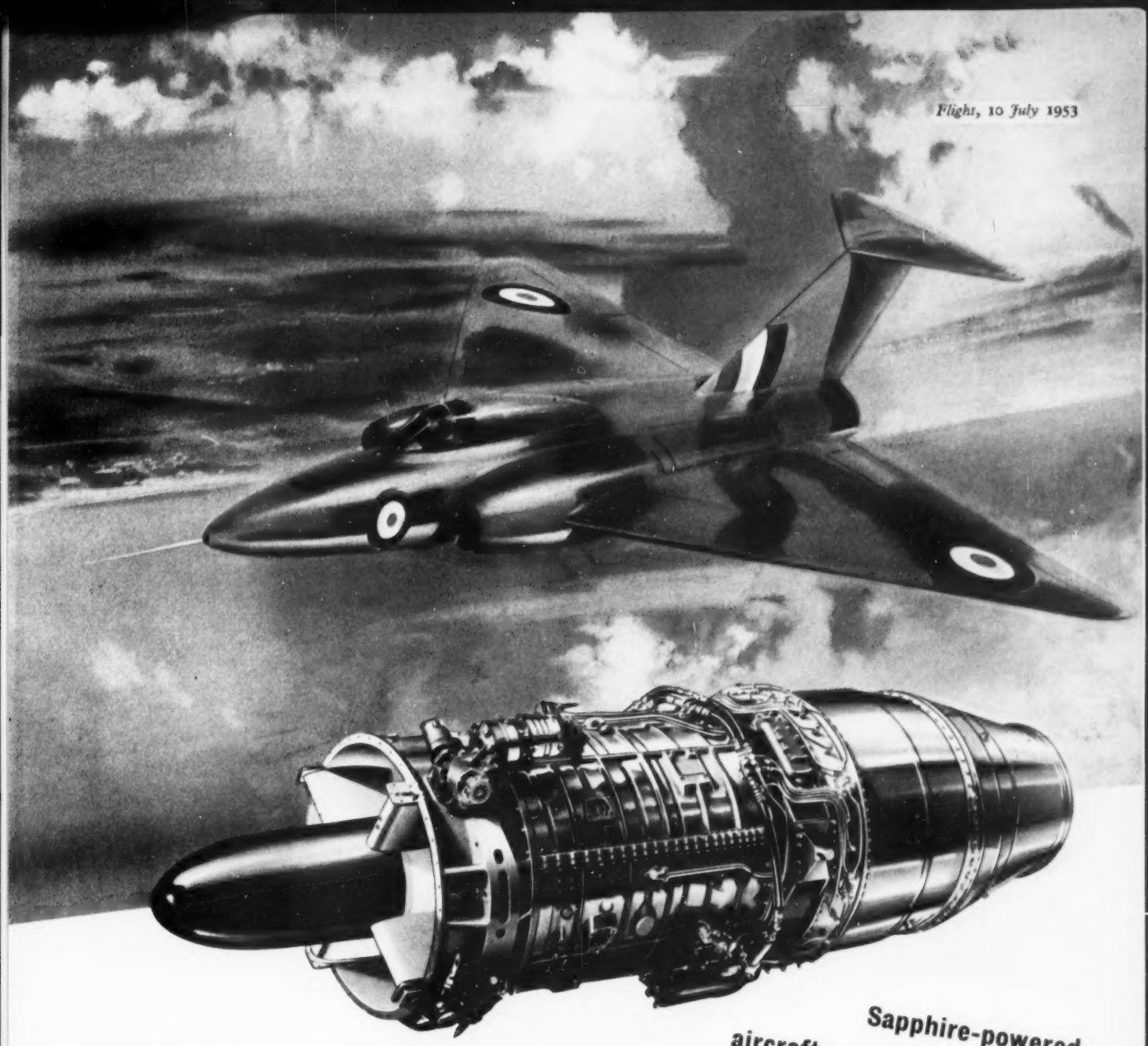
An Admiral's Forecast

THE prediction that air transport will in time supersede sea transport was attributed to Admiral of the Fleet Viscount Cunningham in a speech made in Edinburgh last week. The speaker, who was being installed as an honorary member of the Edinburgh Merchant Companies, added: "The sea and ships have still a great contribution to make to the history of the world."

U.S.A.F. Manpower

GEN. VANDENBERG, retiring U.S.A.F. Chief of Staff, stated recently in New York that the Service was seriously handicapped by a shortage of men. "Next year," he said, "while increasing our air force by about ten wings, we are expected to reduce the number of people in it by 20,000." Pointing out the difficulty, if not the impossibility, of this, the General declared that the U.S.A.F. was at present rejecting three times as many volunteers as it accepted.

WHAT'S NEW AT FILTON was partially, if not completely, revealed to staff and students from the R.A.F. Staff College, Bracknell—recent visitors to the Bristol Aeroplane Company. Here a Mk 32 Freighter and the Type 173 helicopter form a background for their tour.



Sapphire-powered aircraft are the Keystone of Western Defence

Britain's first operational delta-winged aircraft the Gloster Javelin is powered by two Armstrong Siddeley Sapphire turbojets, the engines which are destined to be of the greatest strategic importance in the equipment of Western air forces.

The Hawker Hunter F.2 fighter and the Handley Page Victor bomber are also powered by the Sapphire turbojet while its American version the Wright J.65 powers the Republic F.84F Thunderstreak and the Martin B.57 (Canberra).

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THE QUEEN'S REVIEW OF THE R.A.F.

Odiham's Royal Occasion: the Parade and Fly-past

THE Queen's Review of the Royal Air Force, to take place on Wednesday next at Odiham airfield, Hampshire, is the first such Royal Review since that of 1935. In that year, some 200 aircraft were inspected on the ground at Mildenhall, and later flew in formation over Duxford to give the R.A.F.'s airborne salute to His Majesty King George V in his Jubilee year. This year, more than 600 machines will fly past Queen Elizabeth at Odiham while 300 other aircraft, together with some 3,000 personnel, are paraded on the ground. An illustrated preview of the arrangements for Review Day is here given.

Her Majesty Queen Elizabeth II.

The Queen and the Duke of Edinburgh are due to arrive by train at Winchfield station at 11.30 a.m., and will be met by the Duke of Wellington (Lord Lieutenant of Hampshire). At the same time, at Odiham, twelve squadrons representing all R.A.F. Home Commands, the R.A.F. Regiment, W.R.A.F., apprentices and boy entrants, will march on parade and form up in Review Order. The royal party—including the Duke and Duchess of Gloucester, the Duchess of Kent and Princess Alexandra—will drive to the airfield and be received by the Secretary of State for Air.

At 11.45 the Colour party and escort squadron will march on, preceded by the R.A.F. Central Band, and after the arrival of Her Majesty the royal salute will be given. The Queen will inspect the parade, and then return to the dais, from where she will watch the Colour being paraded. The ceremonial parade, the responsibility of Technical Training Command, will be commanded by G/C. R. J. A. Ford, C.B.E. After the ceremony has been completed, the whole parade will march past Her Majesty, who will afterwards take luncheon in the Officers' Mess at Odiham, in company with the Air Council.

Beginning at 2.30 p.m., after lunch, the static parade of aircraft, and their associated crews and personnel, will be inspected by the Queen. Marshalled on the ground (as shown in the diagram) will be 60 Chipmunks, 12 Prentices, 12 Harvards, six Balliols, four Provosts, six Austers, seven Ansons, nine Oxfords, five Valettas, six Hastings, five Varsities, four Shackletons, four Lancasters, four Neptunes, one Sycamore, six Canberras, eight Lincolns, four Washingtons, four Venoms, 16 Sabres, 50 Vampires, 84 Meteors and one Freighter.

The four lines of aircraft will be arranged according to size, the aircraft in each line being grouped by Commands. The first line of 72 machines facing the saluting dais will consist of Meteors, Vampires, Venoms and Sabres, the second will comprise 26 four-engined types, the third will be of 76 Meteors and Vampires, and the fourth will include the medium size types, and also a number of further Vampires. The curved section of the lines, opposite the dais, will be occupied by the small training types. Her Majesty will drive past every section of the parade, starting at the aircraft lined up to the right of the dais, then visiting the trainers in the centre, passing on to the vehicle and ground equipment section, and returning to the dais past the aircraft assembled on the left. Commanding the static parade is A. Cdre. G. D. Stephenson, C.B.E.

The Queen's tour of the parade will take approximately one hour, after which the royal party will receive an explanation of the way in which the fly-past, scheduled to begin at 3.40, has been organized. In view of the widely differing speeds of the types taking part, the planning and timing of the fly-past—which is under the control of A.V-M. the Earl of Bandon, C.B., D.S.O.—is indeed a complicated task. Formations and single aircraft will take-off from 42 bases, including those at St. Eval (Cornwall), Pembroke Dock (South Wales), Ballykelly (Northern Ireland), Kinloss (Morayshire), Binbrook (Lincs), Coltishall (Norfolk), West Malling (Kent), and Tangmere (Sussex), and will converge to a point at Leavesden, just north-west of Watford, to begin the final 40-mile straight approach to Odiham. This run-in passes slightly to the east of Slough and Windsor and directly over Blackbushe Airport. Continuing past Odiham, the

Lord De L'Isle and Dudley, Secretary of State for Air.

Air Chief Marshal Sir William F. Dickson, Chief of the Air Staff.

THE QUEEN'S REVIEW OF THE R.A.F....

participating aircraft will disperse on reaching Lasham.

The 446 jet-powered and 193 piston-engined aircraft taking part will make the fly-past the largest, as well as the most complex, ever performed by the R.A.F. Aircraft will be drawn from Bomber, Fighter, Coastal, Transport, Flying Training, Home and Maintenance Commands, 2nd T.A.F., the R.C.A.F. and the R.A.A.F. Prototypes of the V-bomber and the super-priority fighters will take part, by arrangement with the Ministry of Supply.

The time interval between each of the 47 separate formations will vary from half a minute to one minute. The fly-past height will range from 400ft to 1,900ft according to the type of aircraft. The leading machine will be a Bristol Sycamore helicopter flying at 98 m.p.h., and the speed of successive formations will gradually increase, the Hunter and Swift F.4 concluding the review at some 665 m.p.h. Total time for the complete fly-past to cross Odiham is estimated at half an hour.

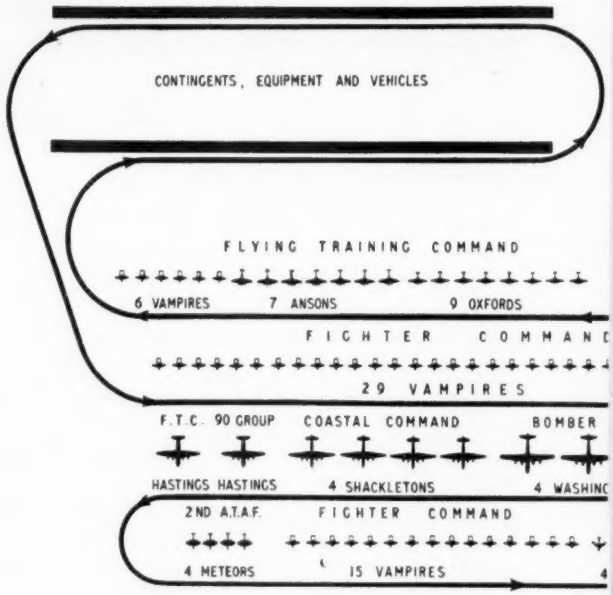
The size of individual formations will vary according to the aircraft type, ranging from three machines (Sunderlands and Hastings) to 36 (R.C.A.F. Sabres). There will be a formation of eight Swift F.1 fighters, and nine separate formations each of 24 Meteor 8s from Fighter Command. Bomber Command aircraft will include two formations each of 24 Canberras, as well as the Lincolns and Washingtons. A formation of 24 Sabres and one of 24 Venoms will represent 2nd T.A.F. Coastal Command will provide two Shackleton formations each of nine aircraft, and one of five Neptunes, as well as the Sunderlands.

Two alternative forms of fly-past have been planned to meet the possibility of bad weather. If the cloud base is low, all formations will take part, but their heights will be modified. If, in addition, the visibility is bad, the fly-past will be restricted to the jet-powered aircraft.

Arrangements have been made to admit up to 25,000 members of the public, and admission is by ticket only obtainable in advance from the usual agencies. It has been pointed out by Air Marshal Sir Dermot Boyle, K.B.E., C.B., A.F.C.—who is responsible for the organization of the Review—that only those who arrive early are likely to obtain a reasonably good view of the ground parades. The remainder will, of course, be able to see the fly-past, which will also be visible over a large area along the route.

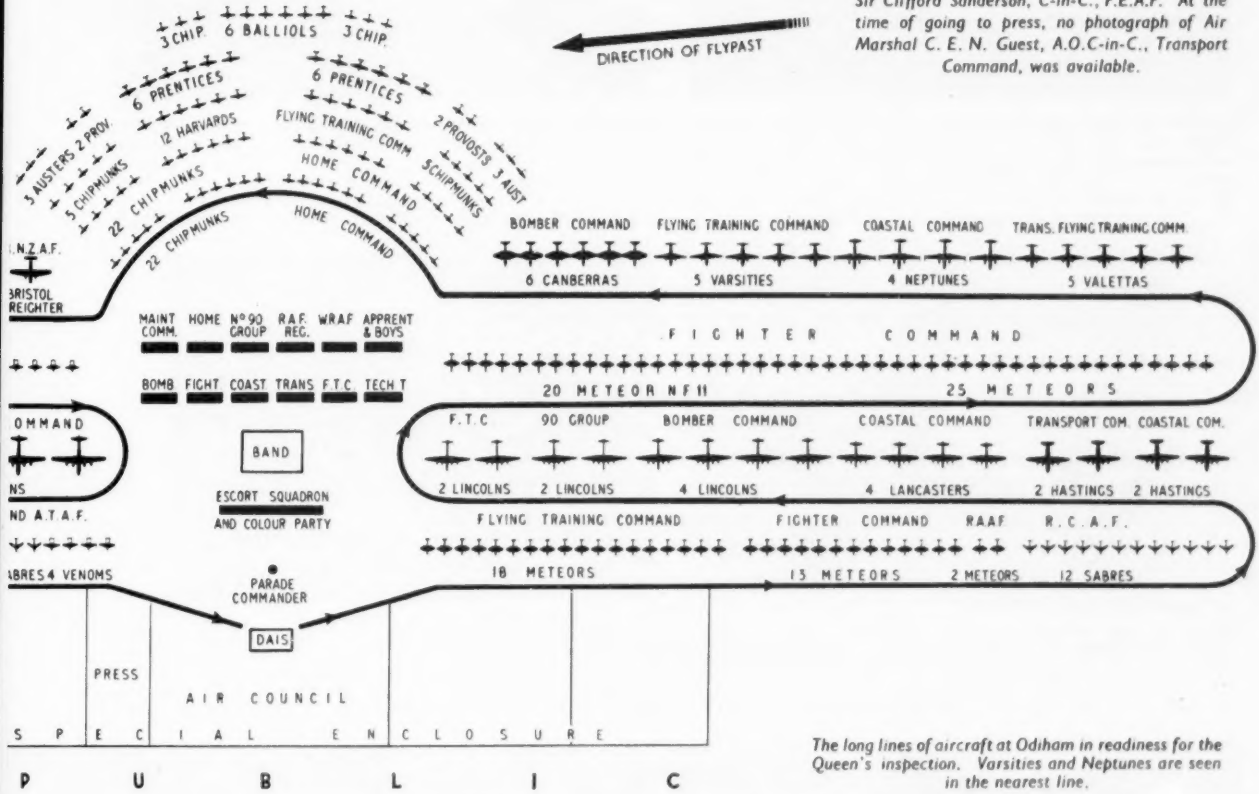
On the following pages the principal types represented in the fly-past and/or the ground parks are illustrated. The pictures are accompanied by pertinent facts concerning roles and variants and characteristics, and are grouped approximately in fly-past order.

It is both surprising and regrettable that no specimen of the de Havilland Mosquito or Hornet has been included, for both types continue to render excellent service, especially in Malaya. Nor does the stalwart Bristol Beaufighter have a place.

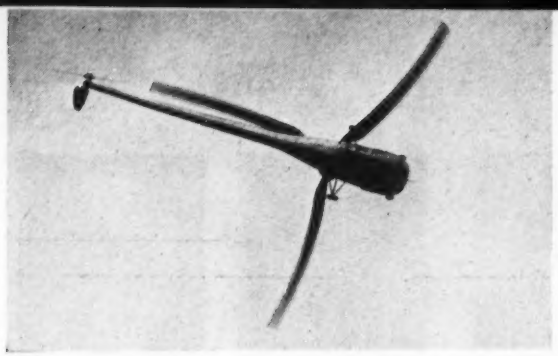


This comprehensive plan shows the form of the ground parades at Odiham. The central ceremonial parade will take place before the Queen at noon, while after lunch Her Majesty will inspect the lines of aircraft, equipment and vehicles, following the route shown. At 3.40 p.m., the fly-past of 639 aircraft will begin.

The Air Council and High Command of the Royal Air Force: (Above, left to right) The Hon. George Ward, M.P., Parliamentary Under-Secretary of State for Air; Air Chief Marshal Sir John W. Baker, V.C.A.S.; Air Marshal Sir Ronald Ivelaw-Chapman, Deputy C.A.S.; Air Marshal Sir Francis J. Fogarty, Air Member for Personnel; Air Chief Marshal Sir John Whitworth Jones, Air Member for Supply and Organization; Air Marshal Sir John N. Boothman, Controller of Supplies (Air). Sir James H. Barnes, Permanent Under-Secretary of State for Air; Air Marshal G. H. Mills. A.O.C-in-C., Bomber Command; Air Marshal Sir Dermot A. Boyle, A.O.C-in-C., Fighter Command; Air Marshal Sir Alick C. Stevens, A.O.C-in-C., Coastal Command. (Left) Air Marshal L. F. Pendred, A.O.C-in-C., Flying Training Command; Air Marshal L. G. Harvey, A.O.C-in-C., Maintenance Command; Air Marshal Sir Victor E. Groom, A.O.C-in-C., Technical Training Command; Air Marshal H. T. Lydford, A.O.C-in-C., Home Command; Air Chief Marshal Sir Robert M. Foster, C-in-C., 2nd T.A.F.; Air Chief Marshal Sir Arthur P. M. Sanders, C-in-C., M.E.A.F.; Air Marshal Sir Clifford Sanderson, C-in-C., F.E.A.F. At the time of going to press, no photograph of Air Marshal C. E. N. Guest, A.O.C-in-C., Transport Command, was available.



The long lines of aircraft at Odiham in readiness for the Queen's inspection. Varsities and Neptunes are seen in the nearest line.



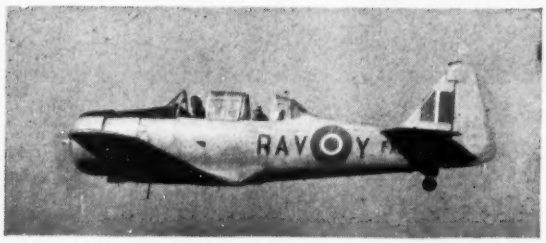
Bristol Sycamore: R.A.F. Fighter Command have taken delivery of a number of Sycamore helicopters (above) for service in the air/sea rescue and communication rôles. A specimen is also being tried out under tropical conditions in Malaya. The engine is an Alvis Leonides, specially adapted for use in helicopters, the rotor diameter is 48ft 6½in and the gross weight about 5,200 lb.

THE QUEEN'S REVIEW OF THE R.A.F. . . .

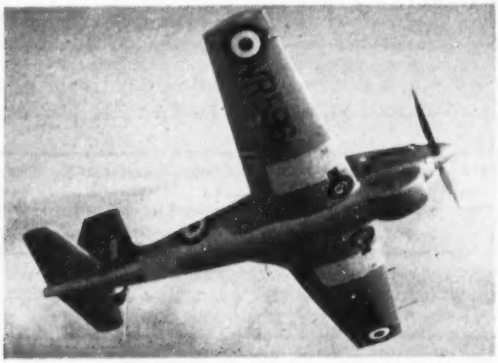
Participating aircraft

de Havilland Chipmunk: Designed by de Havilland's Canadian company, the Chipmunk (below) was adopted in 1949 in replacement of the Tiger Moth for R.A.F.V.R. use. The Service version is the T.10 fitted with a Gipsy Major 8 engine. The span is 34ft 4in, the gross weight 2,000 lb, and the top speed about 138 m.p.h. The type is all-metal.

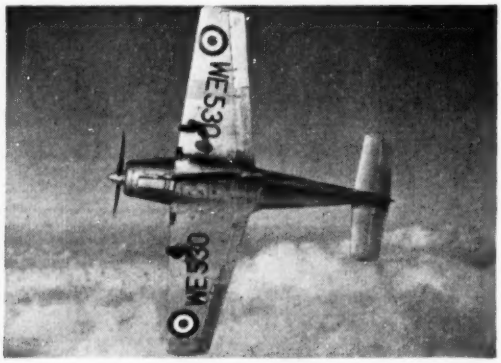
Percival Prentice: Built to a specification of 1943, the Prentice (above) first flew early in 1946. A 2/3-seater basic trainer, it continues to serve the R.A.F. extensively in its T.1 form. The engine is a Gipsy Queen 32, which gives a top speed of over 140 m.p.h. Span and gross weight are 46ft and 4,200 lb. The type is now being superseded by the Provost.



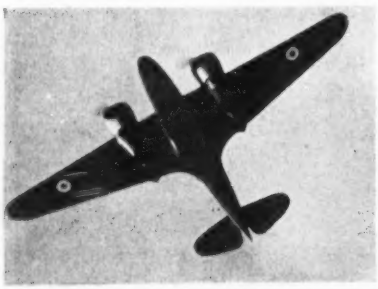
North American Harvard: As its manufacturer's name implies, the Harvard (above) is an American aircraft and was first introduced into the R.A.F. before the war. It continues to prove popular and successful in the training of R.A.F. pilots. With its Pratt and Whitney Wasp engine, the Harvard has a top speed of about 200 m.p.h. and weighs some 5,300 lb. The span is 42ft.



Boulton Paul Balliol: Powered with a Rolls-Royce Merlin engine, the Balliol T.2 advanced trainer has a speed of nearly 290 m.p.h. It measures 39ft 4in in span and weighs about 8,400 lb in flying order. The pupil and instructor are seated side by side and a fixed gun, bombs or rockets can be carried.

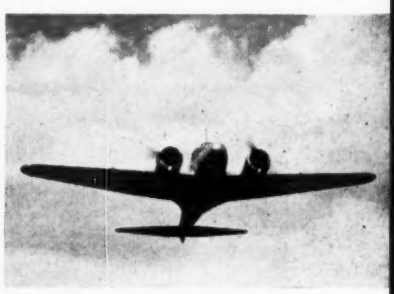


Percival Provost: This is the latest (and probably the last) piston-engined R.A.F. trainer, a jet development being already ordered. The Provost T.1, represented at Odiham, has an Alvis Leonides engine, side-by-side seats, and measures 35ft 2in in span. Gross weight and top speed are respectively 4,250 lb and 200 m.p.h.



Airspeed Oxford: This twin-engined trainer (left) was introduced into R.A.F. service, as the Oxford 1, before the war. Marks now in service are 2s and 5s, powered with Armstrong Siddeley Cheetah engines. The maximum speed is 180-190 m.p.h., the gross weight about 7,600 lb, and the wing span 53ft 4in.

Avro Anson: Like the Oxford, this faithful old aircraft (right) dates from pre-war years and now serves for communications as the C.19, and for various forms of training as the T.20, T.21 and T.22. The engines are Armstrong Siddeley Cheetahs, the maximum speed about 170 m.p.h., the span 57ft 6in, and the gross weight 10,400 lb.



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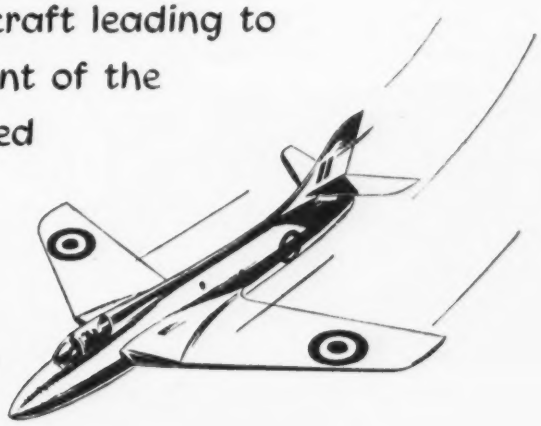

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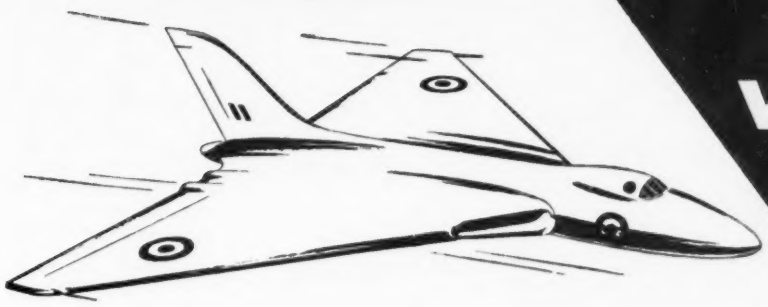
HUNTER
FIGHTER



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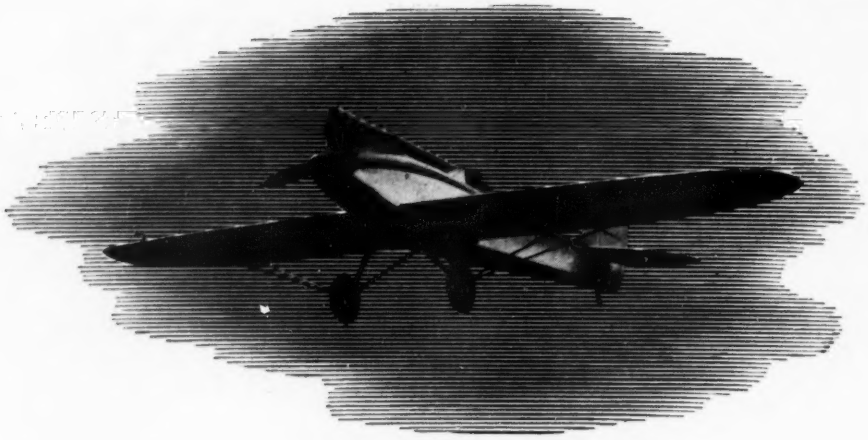
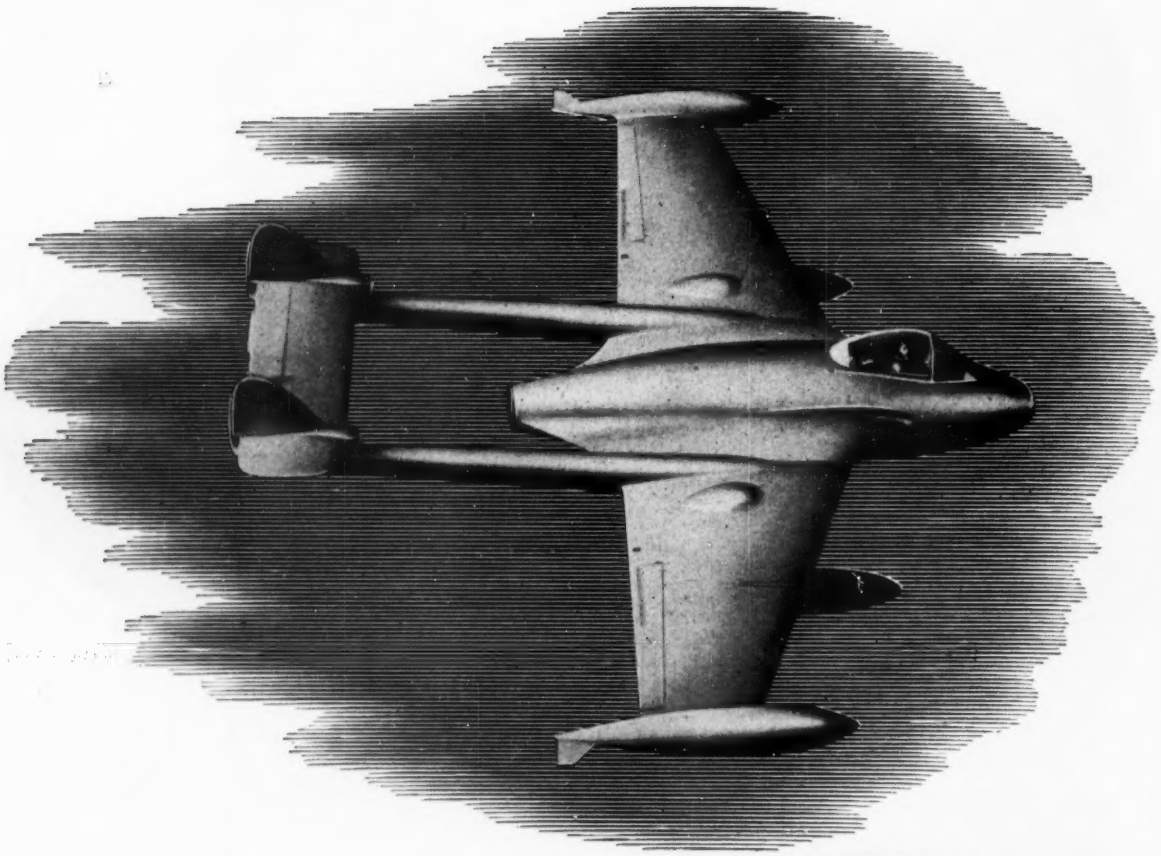


Then and now



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Auster: The most common Austers in the Royal Air Force are the A.O.P.6s. used for artillery observation and illustrated above with the de Havilland Gipsy Major; they weigh slightly more than 2,100 lb, have a span of 36ft, and achieve a maximum speed of 122 m.p.h.

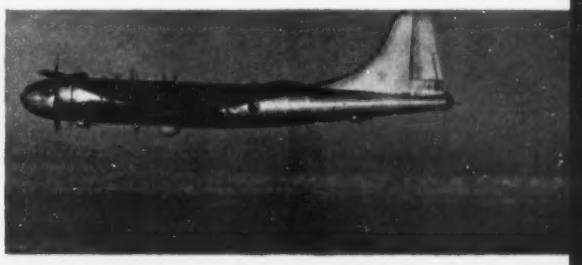
Vickers-Armstrongs Varsity: Developed from the Viking/Valetta family specifically as a crew trainer, the Varsity T.1 (above) is somewhat larger and more powerful and has a nosewheel undercarriage. Its engines are two Bristol Hercules 264s, which give it a maximum speed of 290 m.p.h. Gross weight is 37,500 lb and span 95ft 6in.

THE QUEEN'S REVIEW OF THE R.A.F. . . .

Vickers-Armstrongs Valetta: Three variants of the Valetta are in service. The C.1 (above) is by far the most common and is used by Transport Command for freight and troop-carrying, and for the dropping of paratroops and supplies. All variants have a span of 89ft 3in and the C.1 has a gross weight of 36,500 lb and a maximum speed of over 290 m.p.h.

Short Sunderland: The G.R.5 (above), is powered by four American Pratt and Whitney Twin Wasp engines. It is a maritime patrol bomber and anti-submarine aircraft weighing 60,000 lb and having a span of 112ft 9½in. The top speed is about 210 m.p.h. The Sunderland is the only flying boat in R.A.F. service and though the design is nearly 20 years old no replacement has been ordered.

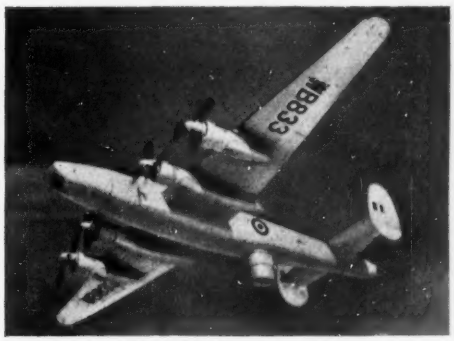
Avro Lincoln: The Lincoln B.2 bomber (above) continues in service with Bomber Command. Its four engines are Rolls-Royce Merlins, its loaded weight 82,000 lb, and its wing span 120ft. Thus, the type is larger and heavier than the Lancaster.

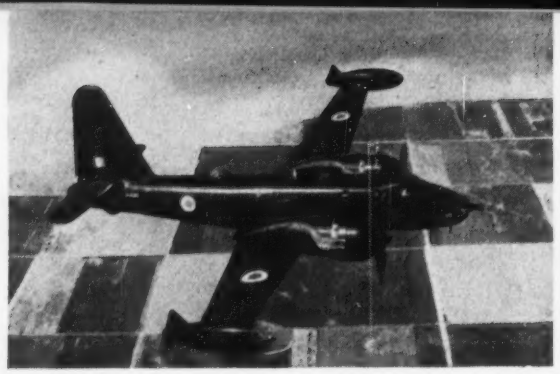


Boeing Washington: The famous Boeing B-29, or Superfortress, with which the U.S. Air Force achieved great success during the war, serves the R.A.F. under the name Washington. Its engines are four Wright two-row Cyclones.

Avro Shackleton: The latest version of this maritime reconnaissance aircraft is the M.R.2 (below), which differs from the M.R.1 in having a longer nose and tail, and a re-positioned radome. Its four engines are Rolls-Royce Griffons, and its span is 120ft.

Avro Lancaster: Still in service with Coastal Command are Lancaster M.R.3s, and one of these grand old machines is shown below over Malta. They have Rolls-Royce Merlin engines and a top speed of 275 m.p.h. Gross weight is 68,000 lb and span 102ft.

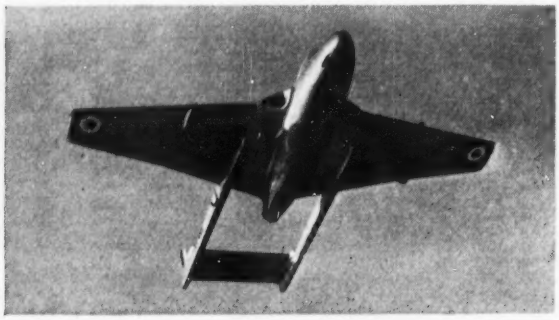




Lockheed Neptune: The famous Neptune P2V-5 of the U.S. Navy serves Coastal Command under the designation Neptune M.R.1 (above). The engines are two Wright Turbo-Cyclones, the span 100ft, the gross weight 58,000 lb, and the top speed nearly 290 m.p.h.

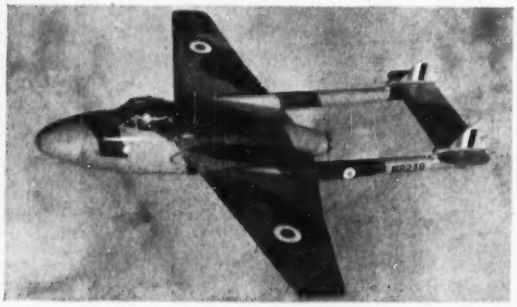
Bristol Freighter: The Mk 31 aircraft above serves the R.N.Z.A.F. With two Bristol Hercules engines, it has a gross weight of 42,000 lb and a top speed of 230 m.p.h. The span is 108ft.

THE QUEEN'S REVIEW OF THE R.A.F. . . .

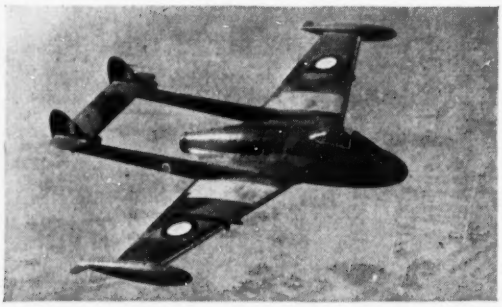


de Havilland Vampire (single-seater): Visually there is little to distinguish the Vampire F.B.5 (above) and F.B.9 fighter/bombers, but the F.B.9 has been developed for tropical operation. In each case the turbojet is a de Havilland Goblin.

Handley Page Hastings: The Hastings is used by both Transport and Coastal Commands. The C.1 and C.2 versions are transports, while the Met. 1 (above) is a long-range meteorological reconnaissance aircraft.

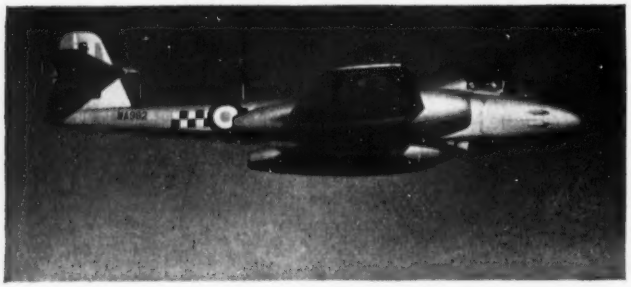


de Havilland Vampire (two-seaters): Versions of the Vampire with side-by-side seating are serving for training and for night fighting. The trainer is designated Vampire T.11 and the night fighter (illustrated above) is the N.F.10.

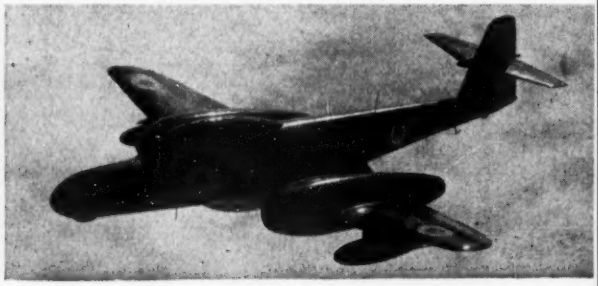


de Havilland Venom: The Venom F.B.1 fighter/bomber (above) is a development of the Vampire with the more powerful de Havilland Ghost turbojet and having a new, thin, wing with leading-edge sweep-back and span of 41ft 9in. The maximum speed is about 600 m.p.h.

Gloster Meteor (single-seaters): Numerically predominant in Fighter Command is the Gloster Meteor F.8 single-seat interceptor fighter (below), powered with two Rolls-Royce Derwents.



Gloster Meteor (two-seaters): Two varieties of two-seaterMeteor are in service—the T.7 trainer and the N.F.11 night fighter, developed by Armstrong Whitworth (below).



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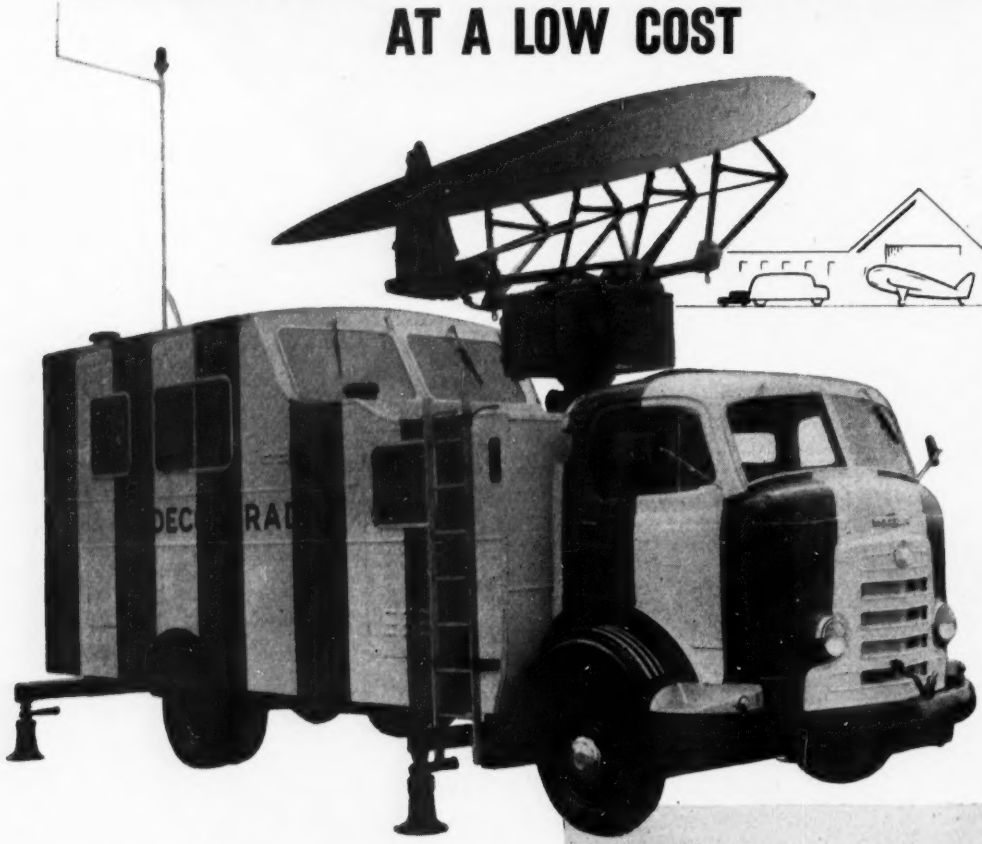

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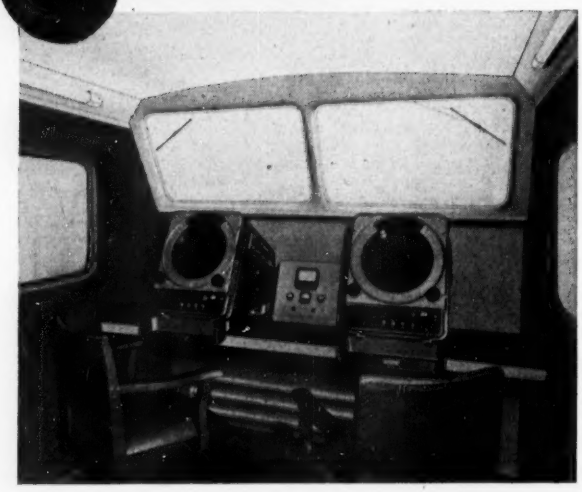

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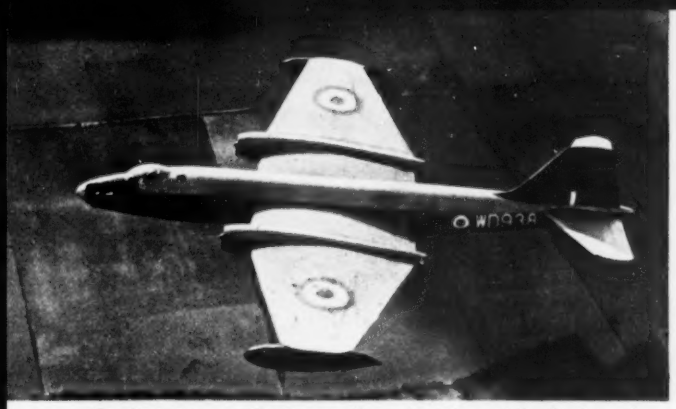
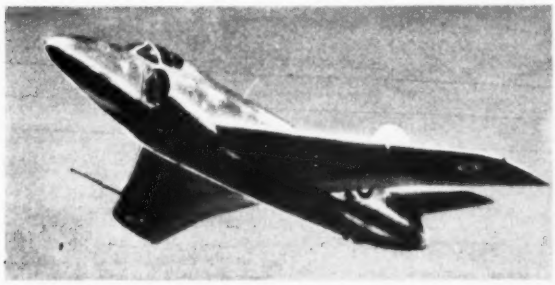


English Electric Canberra: Several versions of the Canberra (two Rolls-Royce Avon turbojets) have been developed, but the most common are the B.2 bomber (above), the P.R.3 reconnaissance machine, and the T.4 trainer. The Canberra was the first jet bomber in R.A.F. service; it has a span of 64ft.

North American Sabre: This famous swept-wing fighter is built under licence by Canadair, Ltd., and is used by both the R.C.A.F. (above) and the R.A.F. The Canadian machines have a silver finish. The turbojet is a General Electric J47, the maximum speed over 670 m.p.h., and the weight 16,500 lb. Armament is six ½in guns.

THE QUEEN'S REVIEW OF THE R.A.F. . . .



Vickers-Supermarine Swift: Two versions of the Swift—the F.1 (above) and the F.4—are, or shortly will be, in service in the R.A.F. Details of performance and armament are secret but the F.4 is believed to have four 30 mm guns. The span is 33ft 7in.

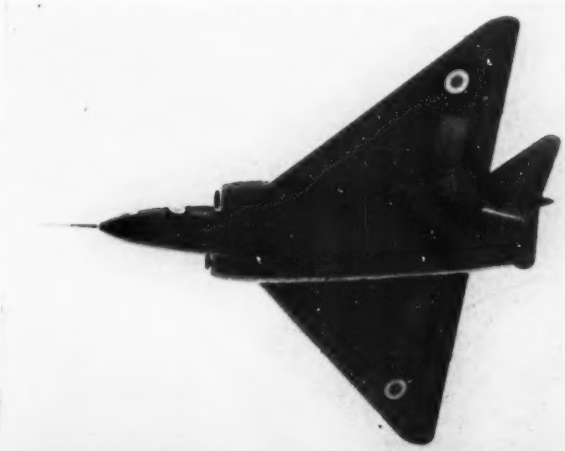
Handley Page Victor: Characterized by a specially developed wing of "crescent" plan form, the Victor B.1 (below) is the latest of a very long line of Handley Page bombers. It is powered with four Armstrong Siddeley Sapphires mounted in the inboard sections of the wing, and it may be supposed that the prominent blister under the forward fuselage houses a radar scanner.

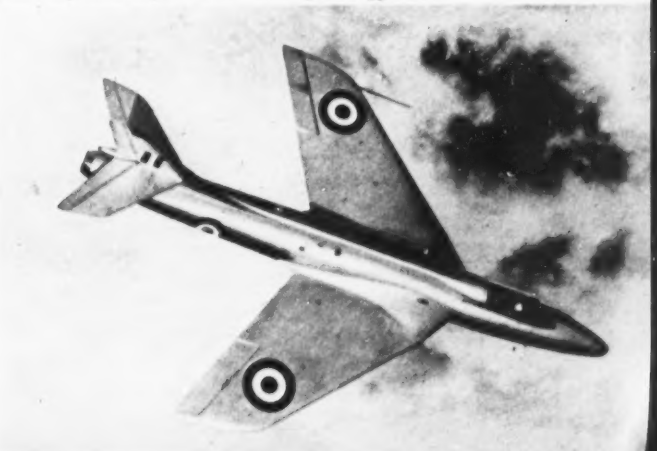
Vickers-Armstrongs Valiant: The Valiant B.1 will be the first four-jet bomber to enter R.A.F. service. The inboard installation of the Rolls-Royce Avon turbojets is admirably shown above, as is the distinctive wing plan.

Avro Vulcan: Of wholly unmistakable appearance, the Vulcan B.1 is powered in prototype form (above) with four Rolls-Royce Avons and in production form with four Bristol Olympus. The span is about 100ft.

Gloster Javelin: Bearing the full designation Gloster Javelin F(AW)1, denoting that it is an all-weather fighter, the delta-wing Javelin has two A.S. Sapphire turbojets. It is conceded to be the finest all-weather fighter in production. The span is 52ft.

Hawker Hunter: The Hunter has been ordered for the R.A.F. in two forms—the F.1 (below) with Rolls-Royce Avon, and the F.2, with Armstrong Siddeley Sapphire. The two machines are practically indistinguishable. The span is 33ft 8in.





INTRODUCING THE ANGLED DECK

Anglo-American Teamwork Revolutionizes Naval Flying

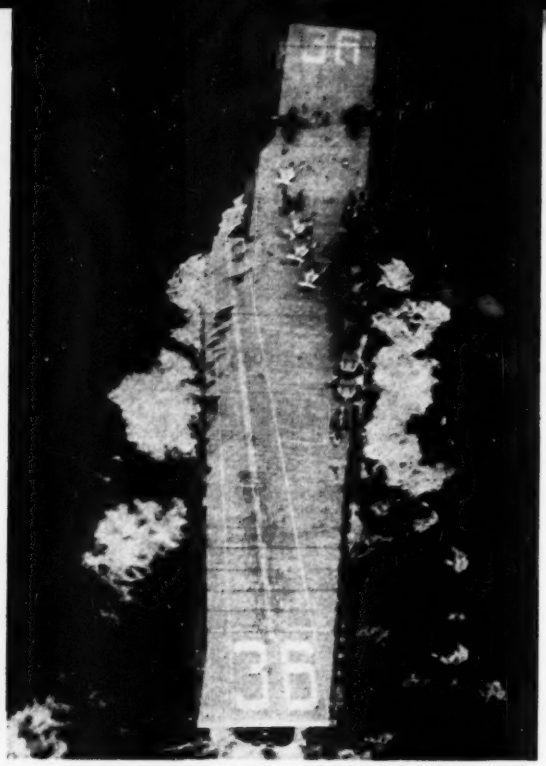
IN August, 1951, discussions were being held between the Ministry of Supply and the Admiralty on the subject of flight-deck design. It was apparent that some way must be found of handling larger and faster aircraft aboard carriers without penalizing the efficiency or safety of flying operations. In particular, the problem of increasing the landing area without (a) shortening the parking area, or (b) extending the deck itself seemed almost insoluble. To Capt. D. R. F. Campbell, D.S.C., R.N., and Mr. L. Boddington of the R.A.E., Farnborough, goes the credit for finding a solution—one of such brilliant simplicity that now, wise after the event, we can only wonder why nobody thought of it sooner.

Their proposal was to incline the flight deck at a fairly small angle to port, leaving the forward area clear for parking and allowing an aircraft which missed the wires to overshoot instead of hitting the barrier amidships. The idea found immediate favour in both British and American naval-aviation circles, and was quickly put to the test.

H.M.S. *Triumph* and *Illustrious* were used, unmodified, for trials designed to evaluate the visual and handling problems involved and to work out operating technique. As a result, the new light fleet carrier *Hermes*, launched in February, will embody an angled deck. The American Navy, which prefers to use the term "canted deck," also carried out trials with a conventional carrier—the *Midway*—and decided to convert an existing vessel, the *Antietam*. Work began last September and was completed on January 5th this year.

Seven days later the *Antietam*'s skipper, Capt. S. G. Mitchell, in a North American SNJ (Harvard), became the first pilot to land on an angled deck. Test pilots from Patuxent followed suit, making landings, take-offs and "touch-and-goes" with the latest and fastest naval aircraft—and finding the new deck a great improvement. Next came a period of combined pilot-training and deck-testing with a large group of inexperienced pilots. Finally the ship embarked an experimental group of Panthers, Skyknights and Guardians for full-scale trials under operational, night and bad-weather conditions, and set course for England.

On June 23rd, as *Antietam* approached Portsmouth, the Fleet Air Arm joined in the trials. Lt-Cdr. P. C. Chilton was the first British pilot to land-on (in a Sea Hawk of No. 806 Squadron, which he commands). Trials continued in the Channel and on June 28th a British pilot, Lt-Cdr. D. G. Parker, made the 5,000th landing aboard *Antietam* since the new deck was installed. The fact that no accidents have occurred throughout this period of intensive flying confirms the value of the original conception and of subsequent Anglo-American development. The occasion was marked with appropriate ceremony (as illustrated on page 42).



U.S.S. "Antietam," the first angled-deck carrier. The sponson carrying the fore part of the landing area adds 25ft to the average width (100ft) of the flight deck. Approximate position of the parking line is indicated by the row of five Panthers, and two Skyknights mark the parallel catapults.

Through the courtesy of the U.S. Navy we went aboard the ship (which, incidentally, is named after a Civil War battle) at Portsmouth last week. A hard day's flying by American and British pilots showed Naval and industry observers the value of the angled deck, and explained the enthusiasm with which our hosts view this British innovation.

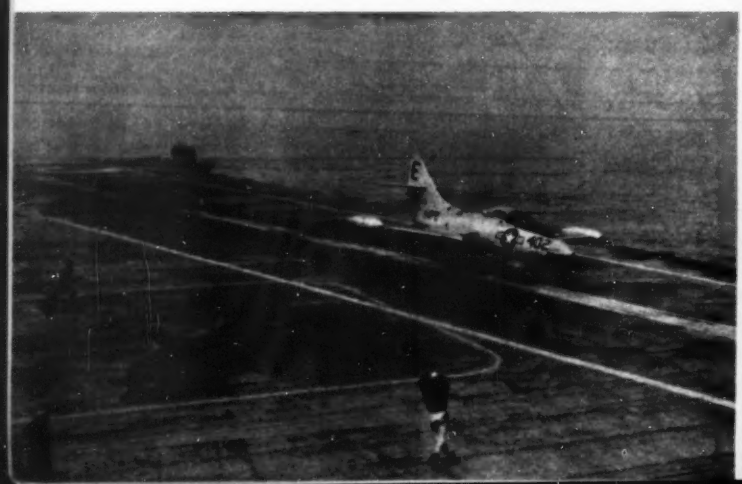
The *Antietam*, we learned, is a CVA-9-class carrier with a displacement of 37,500 tons. She is capable of accommodating 95-100 aircraft and 2,800 men, although the present complement is 2,100, and her top speed is 33 kt. The angled area is set at 8 deg 9 min to the centre-line of the flight-deck, but 10½ deg is now recommended as giving more space for parking; the original concept is, however, unlikely to undergo any other major change. The cost of conversion was $1m, which is already thought to have been regained in reduced damage to aircraft using the new deck.

Flying began with the launching of two Douglas F3D-2 Skyknights. Then eight Grumman F9F-5 Panthers were started by electric trolleys (the two Sea Hawks aboard used the cartridge method), unfolded their wings and taxied to the twin catapults forward, which shot them into wind at intervals of just under 30 secs.

The first advantage of the angled deck became apparent when the first of four Grumman AF-2 Guardians (two "hunters" and two "killers") began to use it for unassisted take-off while the Panthers were still being catapulted. Operating in two sections of four, the Panthers soon returned to demonstrate the "touch-and-go" procedure followed by a pilot whose hook misses all six arrester wires. Before doing so, they reduced weight for landing by jettisoning the contents of their wing-tip tanks. This is achieved by ram pressure through an opening in the nose of the

The Panther on the left has picked up No. 4 wire and is now fully arrested; that on the right illustrates overshoot procedure.

"Flight" photographs



FAIREY GANNET

MORE than ever before Seaborne and Airborne elements are interdependent. The Royal Navy is constantly developing new weapons and new techniques to retain superiority. To attack with these new weapons and develop new methods of keeping the sea lanes clear the Fairey Gannet anti-submarine aircraft has been ordered for the Royal Navy. It has also been ordered for the Royal Australian Navy.

FAIREY AVIATION

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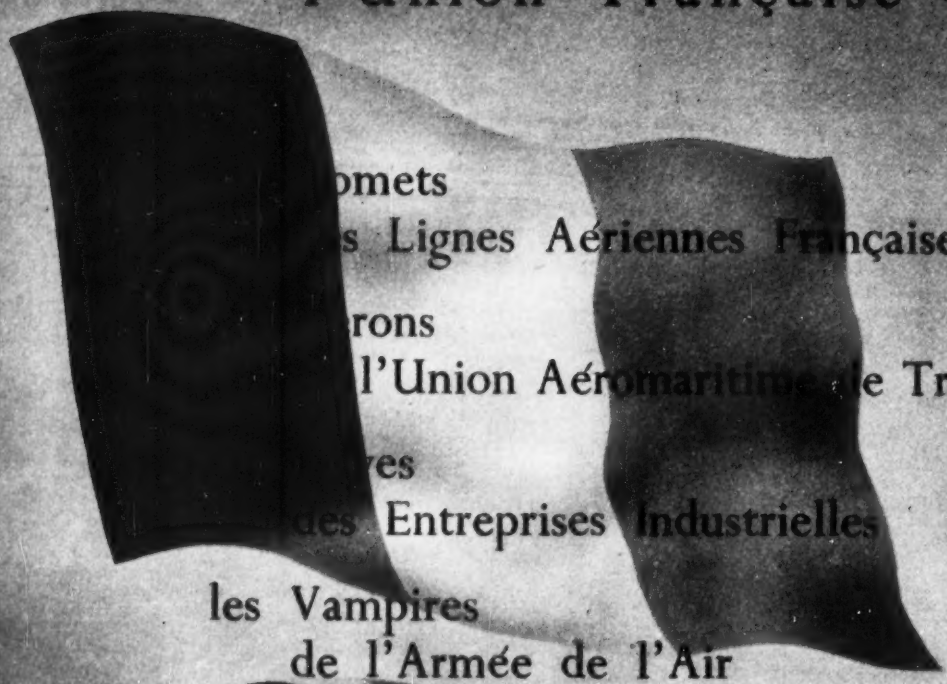
Dans le ciel de France et de l'Union Française



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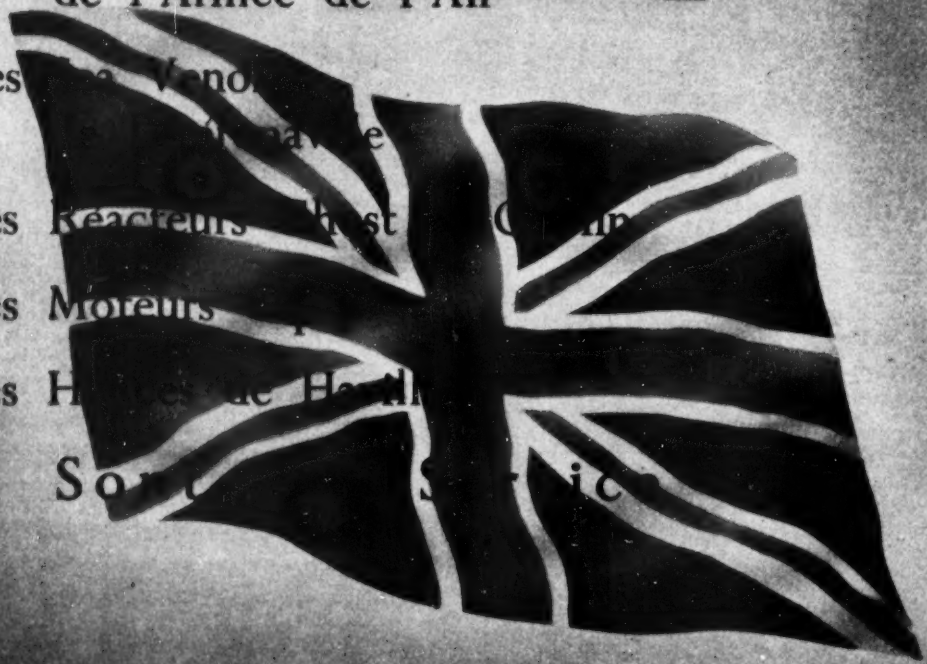
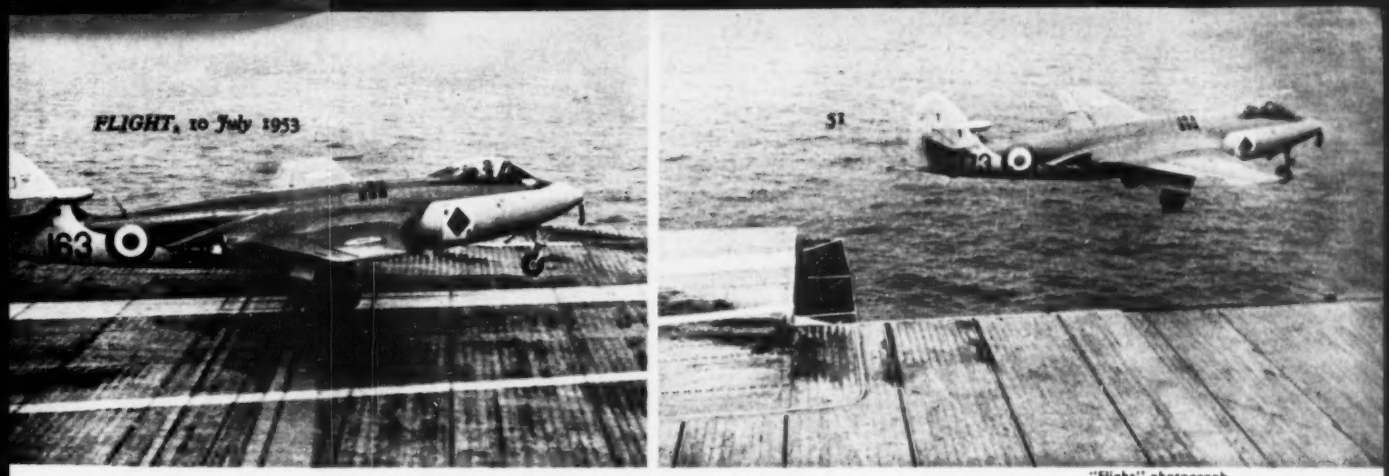


DE HAVILLAND

33 Avenue des Champs Elysées, Paris



"Flight" photograph

Touch and go—illustrated by two Sea Hawks of No. 806 Squadron. Attackers also took part in the "Antietam" trials illustrated here.

INTRODUCING THE ANGLED DECK . . .

tank, and the result is a long trail of vapourised petrol (not kerosine) behind the aircraft. The touch-and-go practice is performed in exactly the same way as a normal landing, except that the hook is retracted. Guided by the deck landing officer ("batsman"), the Panther pilots were making a curved approach which took them through the turbulent wake of the ship's superstructure. With full flap and undercarriage down, and a power setting of 80–85 per cent, the approach speed was about 120 kt.

There was no question of throttling back or flaring-out as the aircraft crossed the threshold of the angled deck. Latest Naval practice as demonstrated by the Panthers—and, later, by British fighters—is for the pilot to point the nose at the deck just before contact, with no reduction in speed or power. Although this sounds alarming and the aircraft certainly arrive hard and fast, the result is in fact a lower rate of sink and consequent reduction in the number of undercarriage breakages. And the amount of speed and power in hand makes an overshoot much easier. One of the Panthers missed the wires when attempting to land, giving a practical demonstration of the value of the new deck, combined with the "power-on" technique.

More proof was furnished later in the day when two Sea Hawks and four Attackers also practised take-offs, circuits, landings and "glancing blows." One of the Attackers picked up a wire but its hook broke off. On a conventional carrier this aircraft would certainly have carried on into the barrier, suffering at least slight damage. As it was, however, the pilot found no difficulty at all in overshooting. His R/T., apparently, was temporarily out of action, for he made an abortive attempt to land-on, using only the stump of the hook—which, of course, was quite incapable of picking up the wire—before flying back to Ford. The *Antietam* does have an emergency nylon barrier for jet aircraft, which can be erected in just over a minute, and could have been used in this case if the Attacker's range had been insufficient for it to reach a shore base.

The destroyer escort was supplemented throughout the trials by a Piaseki HUP-2 helicopter which shuttled about very close to the surface of the sea on the starboard of the carrier whenever flying was in progress. It looked very stable and manoeuvrable and was skilfully flown. Most of the time it appeared to be hovering with its nose towards the ship but it was, of course, flying sideways at the same speed as ourselves.

"Flight" photograph

Having safely landed-on, an F3D Skyknight raises its hook to taxi forward into the parking area. Note the four-finned auxiliary tank.

The Meteor, Sea Venom, Wyvern and Sea Vampire were also to have taken part in the programme, but weather prevented their appearance. We had seen enough, however, for us to share the conviction of both Navies that the angled/canted deck is here to stay. The U.S. Navy has already announced plans for converting five carriers—three CVA-9s and two larger vessels. R.B.

BRITISH INSTRUMENTS

AT present being held at Olympia, London, is the second British Instrument Industries Exhibition, a biennial event under the patronage of five of the instrument industry's trade associations. Although the main emphasis is on instrumentation for general engineering production and testing, and in spite of the fact that most of the aeronautical instrument and accessory firms are, as would be expected, obviously keeping their best surprises for Farnborough, there is an amount of aviation interest on several of the stands.

Electrical turn-and-slip indicators, as fitted to the 1952 British gliding team's Sky sailplanes, are among the aircraft equipment shown by R. B. Pullin and Co., Ltd. Other "pilot's panel" instruments at Olympia include the G.E.C. radio altimeter and the Ferranti gyro horizon. Fuel flowmeters and various meteorological instruments are on the Negretti and Zambra stand, and sound-level meters such as those used in helicopter noise tests are exhibited by Dawes.

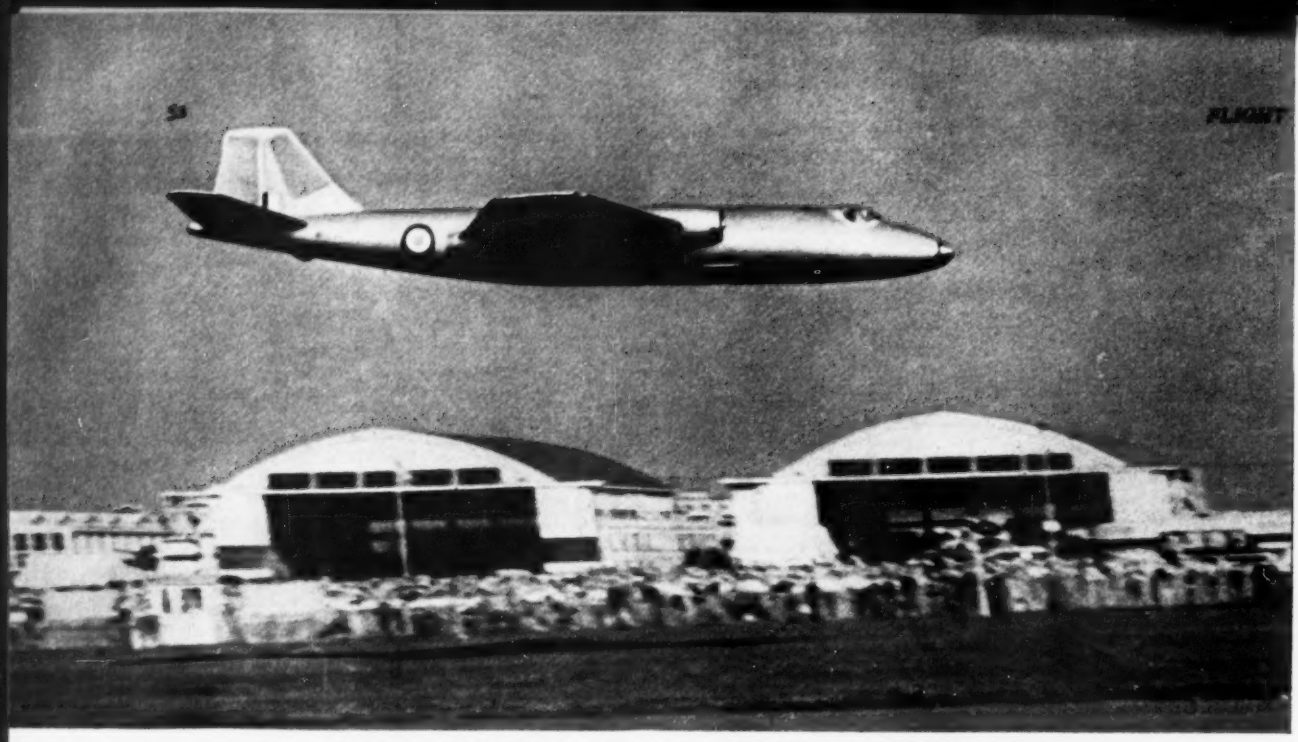
Many firms are exhibiting electronic test apparatus, notably the major valve manufacturers, who show also a wide variety of C.R. tubes. A practical comparison between their now well-known foil strain gauges and the conventional wire type is given on the Saunders-Roe stand, and oxygen breathing apparatus is among the exhibits displayed on the stand of Barnet Instruments, Ltd.

Government departments are as usual represented. A gust anemometer with a response of less than 0.1 seconds is shown on the D.S.I.R. stand, and the Ministry of Supply are presenting airborne survey equipment, weighing only 75 lb complete, for detecting and recording the presence of uranium deposits in the ground.

The exhibition, which has been open daily from 10 a.m. to 6.30 p.m., is due to close tomorrow, July 11th.

LUFTHANSA BUYS AMERICAN

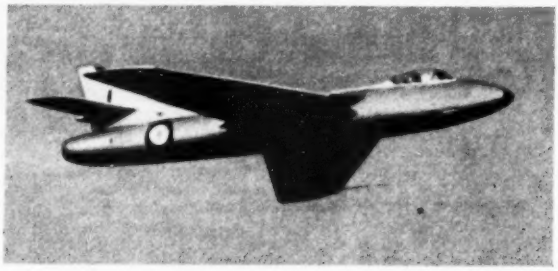
IT was announced in Bonn last week that West Germany has decided to go to the U.S. for the aircraft to equip the country's post-war airline. A spokesman of the company preparing the revival of Lufthansa stated that the first aircraft bought would be the Convair 340 and the Lockheed Super-Constellation, and that delivery of these types "for the time when services are due to begin" had been guaranteed.



The thunder of Avons, the flash of silver in the grilling sun—the Canberra, Beamont up. Below, the Hunter (Neville Duke).

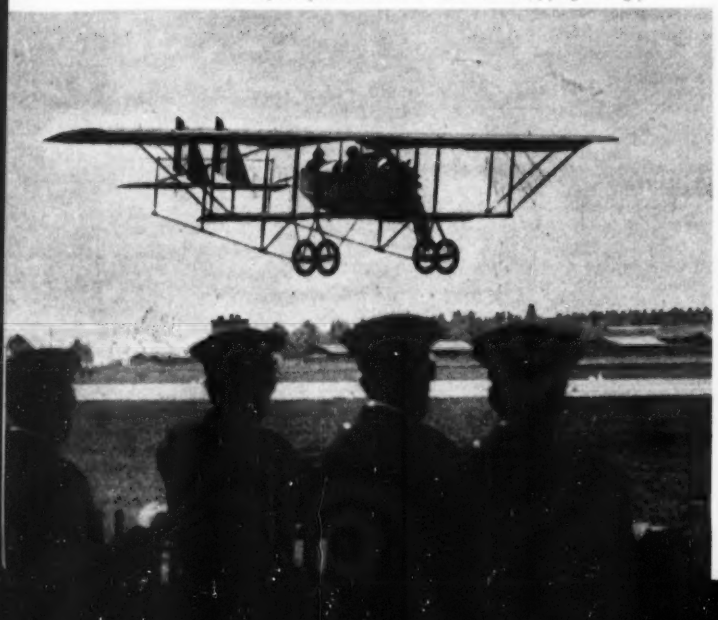
LE BOURGET 1953

"FLIGHT" PHOTOGRAPHS



PERFECT weather blessed the efforts of *L'Union Syndicale des Industries Aéronautiques Francaises* to stage, at Le Bourget last Sunday, one of the greatest international air displays yet seen in Europe. It also enabled Mike Lithgow to provide his hosts with the perfect curtain-raiser by completing (in 19 min 5.6 sec, as reported on page 40) the fastest-ever flight between London and Paris. Although the blue-painted Swift arrived two hours before the display began, the crowds were already massing. Over 200,000 were in position at the start of the 4¼ hr programme, which comprised no fewer than fifty separate flying events.

Out of the past whirrs the Caudron G.3, flying strongly.



The previous day had seen a somewhat less lavish display for 80,000 technicians, members of missions, journalists and other specially invited guests. Of these, at least 3,000 lunched with organizing officials in the impressive U.A.T. Comet hangar. The flying on that day was confined by low-hanging cloud, and in the absence of both sunshine and the military formations of NATO, Saturday's activities were considerably less colourful. Our narrative, therefore, deals with the superlative public display which terminated the 20th Paris Aeronautical Salon.

The first performer was M. Goue, pilot of an Emouchet sailplane fitted with what appeared to be four drain-pipes slung in pairs beneath its high wing. These attachments were, in fact, four S.N.E.C.M.A. pulsejets which lifted the Emouchet from the runway with a noise which would have done justice to a mass formation of V.1 flying bombs. After a very brief take-off run, this unique aircraft jettisoned its trolley undercarriage, climbed quite steeply and circled noisily until, not a moment too soon, the pulsejets were cut for a glide landing. Quieter and altogether more pleasing was the Cessna 180, powered by a 225 h.p. Continental engine, and featuring a new tail design. Both the "180" and the Cessna 195 (300 h.p. Jacobs), which was also demonstrated, were so beautifully finished that no aerobatic tricks at all were required to sustain public interest.

Next in the parade of light types were the camouflaged N.C. 856 air observation post and the shiny, Beaver-like Max Holste, both of which illustrate a French tendency to equip single-engined machines with twin fins and rudders. The Max Holste displayed a short take-off run and steep climb which, coupled with the ability to carry a pilot and four passengers on 220 h.p., suggested that it has the makings of a useful light transport for bush operation. A fine aerobatic performance came from a yellow-painted Saab Safir wearing the three-crown insignia of the Swedish Air Force. This 190 h.p. three-seater makes an excellent trainer as well as an attractive touring aeroplane and is now being used by Sabena for basic instruction of potential airline pilots.

A Morane Saulnier 733 two-seat trainer—actually the ninth of 100 ordered by the French Air Force—gave a lively if rather

over-long exhibition of loops, rolls, stall-turns and inverted flying; it also showed remarkably good aileron control at the point of stall. It was difficult to judge the qualities of the new Potez 75 "home guard" ground-attack aircraft, which was flown within a somewhat narrow speed-range; but with the aid of heavy application of brakes it achieved a short landing run.

British participation in the display was opened by a competent, but hardly stirring, aerobatic display on a Percival Provost by a pilot of Flying Training Command. The French commentator, incidentally, mentioned that "over 100" Provosts had been ordered by the R.A.F.

Proceedings became a good deal more exciting when a Dassault Flamant, which had taken off earlier in the programme, disgorged two French parachutists at a height estimated at 10,000ft. As the tense seconds ticked past the men became visible first as tiny black crosses, each trailing a powdery white cloud, and finally as men lying with faces towards the crowd and arms and legs stretched out in perfectly controlled free descent. At no more than 700ft, after a total delay of 40-45 seconds, both men pulled their ripcords and the parachutes opened not a second too soon. The vast crowd shouted its applause when the two men landed on the grass within 100 yds from the enclosure.

This increase of tempo was kept up with the appearance of the Sipa 200 Minijet, the first of several participating aircraft using one or other of the brilliant Turboméca series of lightweight turbojets which have contributed so much to recent French aeronautical distinction. To the tune of a healthy hiss from the 350lb-thrust Palas, this attractive little two-seater turned, rolled, dived and looped like a baby jet fighter. Its pilot, M. Fischl, proved the Minijet's docility by almost violent use of rudder and aileron to the point of touch-down, whereupon he pulled it up within 150 yd by clamping on a pair of the most efficient brakes seen in the display. Consecutive demonstrations of the M.S. 755 Fleuret and the Fouga C.M. 170 Magister gave us an opportunity to compare these lively and economical jet trainers, both of which are powered by two 880 lb thrust Turboméca Marborés. The top speed of the T-tailed Fleuret is quoted as 420 m.p.h., compared with 395 for the Magister (and it certainly gave a livelier impression). From one of its high-speed passes it zoomed, seemingly without effort, to at least 8,000ft, and its rate of roll appeared comparable with that of some jet fighter of far greater power. The Magister's tandem enclosure, however, was seen to have two occupants, whereas only one of the Fleuret's side-by-side seats was occupied.

Making its first appearance in public was the ten-seater Dassault 316, whose two S.N.E.C.M.A. 14Xs confer a remarkable climb. The 316 bears an obvious relationship to the Flamant but gives a neater, more clean-cut impression, which is heightened by the large single fin and rudder.

The little S.O. Djinn helicopter, which has "cold" tip-jets fed with compressed-air by a Turboméca Palouste, gave an enchanting performance of manœuvrability. A favourite trick of its pilot, M. Jean Dabos, was to spin the fuselage rapidly both with and against the rotor. Three gleaming new additions to the Air France fleet—Comet, Viscount and Super Constellation—were now to be glimpsed in stately orbit. When all three had completed a low *passage* above the runway a handsomely marked Comet of U.A.T. was cleared to take-off for Casablanca.

Three English-based B-47B Stratojets of the U.S.A.F. should have appeared next, but only one of these machines turned up for a very sedate fly-past at over 1,000ft. This disappointment was partly compensated by the spectacle of 24 B-26 tactical bombers, sprouting guns and painted black and yellow, which flew from Laon in four elements of six. With the aid of, respectively, Jato and reverse-pitch airscrews a ten-seat Grumman Albatross amphibian demonstrated both a rapid take-off and short landing.

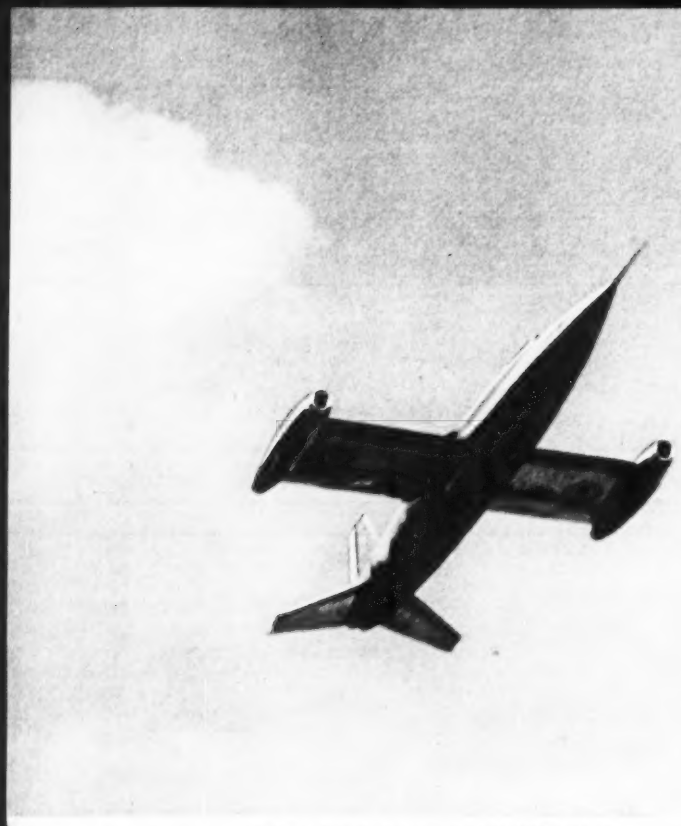
Tidy work by the Patrouille Acrobatique Française on their F-84s.

Alone and aloof—the Boeing B-47B Stratojet, which flew from England.

Flying light, the spidery Hurel Dubois 31 was able to take-off in no more than 500 yd, returning with one of the two 800 h.p. Wright radials inoperative. Although in many respects the Hurel is the nearest approach yet to the Dakota replacement ideal, its unconventional layout still evokes criticism—particularly on the score of ground handling. Perhaps pilot Fischl had these objections in mind when, after a contracted landing, he casually flew the H.D.31 down the runway to its parking position. One of the few French transports to have broken into the current commercial market is the Nord Noratlas, flown with great precision at Le Bourget by M. Chautemps. Despite its bulk—for the Packet-like Nord can take 40 passengers in comfort—it flew nimbly with one of the two Hercules feathered. A first-class performance was enhanced by the simultaneous appearance of four more Nord 2501s which flew overhead in excellent formation.

An even larger aircraft to be given the full fighter treatment was

The S.O.4050 Vautour supersonic light bomber/heavy fighter, with tandem undercarriage and twin S.N.E.C.M.A. Atars.



Glimpse into the future—the S.O. 9000 Trident

LE BOURGET 1953 . . .

Avro's Shackleton 2, flown by Johnny Baker, who turned the big white maritime reconnaissance machine at seemingly impossible angles. Metaphorically, the peak of his performance was the lowest part—a surprisingly fast beat-up with three of the four Griffons stopped and eighteen of the twenty-four blades feathered. One of the Sea Venoms now being produced by S.N.C.A.S.E. was put through furious paces by Jacques Lecarme. The French commentator evoked quite a stir during his performance by informing the crowd that Jacques was the father of seven children. Another S.E. pilot, M. Petit, flew the Mistral, his company's version of the Vampire, and showed convincingly the increased rate of climb conferred by the installation of a Hispano-built Rolls-Royce Nene turbojet.

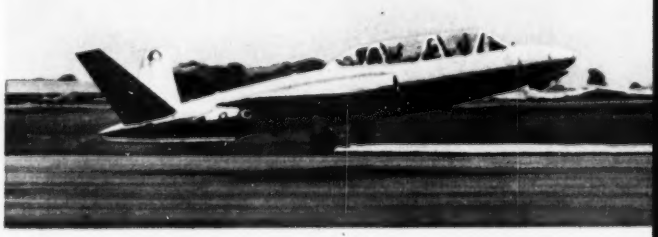
An event of some significance was the formation landing by two Vampires, one of which was equipped with the S.N.E.C.M.A. *deviateur de jet*. Not only did the aircraft using the thrust-spoiler come to a halt in half the distance taken by the standard aircraft, but to the accompaniment of resonant sounds and in a cocoon of shimmering heat-haze it succeeded in taxying backwards.

One of the stars of the show was the little S.O. 9000 Trident, so named, perhaps, because of the positioning of its three power units—two Marborés at the wing tips and a liquid-fuel rocket at the tail of its dart-like fuselage. Presumably to avoid any risk that the anhedral tailplane might scrape the runway, M. Guignard employed a very shallow take-off angle and the Trident's departure took up a large proportion of the 7,900ft available. Even without the rocket, which has not yet been installed, the Trident was seen to be capable of remarkably high speeds for an aircraft of little more than 1,700 lb total thrust, and the stubby, straight wings and powered controls give a high rate of roll. The Le Bourget demonstrations suggest that the Trident's designers stand every chance of attaining their objective—supersonic speed in level flight with a simple and relatively cheap aircraft. Flight-testing of the S.E.R.P. rocket is already being conducted in the 6026 Espadon, which was publicly demonstrated for the first time on Sunday. As the Espadon sped overhead the rocket burst into life with a roar and a 30ft spurt of orange flame. A trail of black smoke traced the ascent of the aircraft to a height where it was scarcely visible—although the flame continued to glow.

Differing exhibitions of composite power were given by the Mamba-Nene Bréguet Vultur strike aircraft and the Nord 2200 fighter, which ascended from a column of Jato smoke. Although now growing obsolete, the 2200 evidently handles well at low speeds and has an exceptionally short landing-run. (This could hardly be said for the bulbous S.E. Grognard, which uses two ribbon parachutes for landing.) The Mystère II (flown by Muselli) was eclipsed by its more powerful stable-mate, the Mk IVA, with the latest 7,275 lb-thrust Hispano Tay. With Col. Rozanoff at the controls, it took off for the afternoon's first attempt at *franchissement du mur du son*. The commentator announced that he was putting us in touch with the pilot, and soon a deep voice was heard reading off heights. Twice the Mystére dived, and twice the double bang was heard. The colonel also chatted over the public-address system during a full-speed low run over the densest part of the crowd, although whether many of the audience heard him was open to doubt.

The twin-jet, swept-wing S.O. Vautour was piloted by Guignard, who also attempted to produce a *boum*, but although he exceeded Mach 1 no sound was heard in our part of the airport. Powered

(Below) The Nord 2200 gets under way.



The Fouga C.M.170 Magister, demonstrated two-up. (Left) The rocket-assisted departure of a Grumman Albatross rescue amphibian of the U.S. Air Force. Its landing was also impressively short.

One of the most fearsome spectacles yet seen (and heard) at a flying display—the S.O. Espadon, with its S.E.R.P. rocket in action.

by two Atar axials of 5,500 lb apiece, the Vautour is the first twin-jet French aircraft to achieve supersonic flight. Guignard's handling of it was impressive, particularly his steep final turn for a parachute-braked landing which looked "hot" but not unsafe.

The *mur*, by now somewhat battered, was subjected to further assaults by the Hunter and Swift, both of which produced satisfactory bangs. When Mike Lithgow took off in the record-breaking Swift F.4 it was observed that four "fences" instead of two are now mounted on the sharply swept wings. Afterburning gave the Swift's Avon a particularly throaty sound on at least one low run.

During one of those periods of silence which always precedes the sonic thunderclap, keen eyes spotted the Hunter moving into a wide area of clear blue sky directly above. Barely visible, it slipped noiselessly overhead; then, as cloud again screened the aircraft, a treble bang shook the ground and the distant scream of the Avon followed in the Hunter's unseen wake. Neville Duke showed its paces at close quarters—in the lowest, speediest low run of the day—before signing off with a sequence of slow and fast rolls.

Roland Beamont, flying the Canberra B.2, gave a seven-minute show which embodied all he knows of demonstration flying—and no pilot knows more. The Parisian crowd thrilled to every move of the silver bomber, whether bearing down towards the runway for a fast run or wheeling sharply with one wing-tip seemingly brushing the grass. In the red Avro 707A, Roly Falk lent realism to the Atlantic and Vulcan models which captured so much attention in the static exhibition. A very slow, nose-up fly-past with dive-brakes extended and the shortest landing of the day by any jet aircraft were notable features of the little delta's performance. The Canberra was further demonstrated in triplicate and with zest—by a flight from No. 101 Squadron (Binbrook).

Helicopter displays of individuality were provided by "Sox" Hosegood (Bristol 171), M. Boulet (S.E. 3120 Alouette) and Capt. Valérie André (Hiller) who is not only a pilot but a surgeon, experienced parachutist and, we were assured, a most attractive young Frenchwoman. In an S.E.-built Sikorsky S-55 (dubbed *Eléphant Joyeux* by the French) M. Henry performed a gallant salute to the colours. The helicopter flew to the centre of the airport with a large pole hanging vertically beneath; this was detached and erected and a tricolour broken, the S-55 circling respectfully.

Expressing both quantity and quality came the N.A.T.O. military formations—490 French parachutists spilling from 15 C-119 Packets, aerobatic teams of R.A.F. Vampires and French and American Thunderjets, and a stream of 96 jet fighters—32 Sabres and 64 Thunderjets. To the French parachutists and American Thunderjets of the 86th Fighter/Bomber Wing went the major honours.

SOME ADDITIONAL OBSERVATIONS

We conclude this report with some additional notes on aircraft which participated in the flying displays and/or static park.

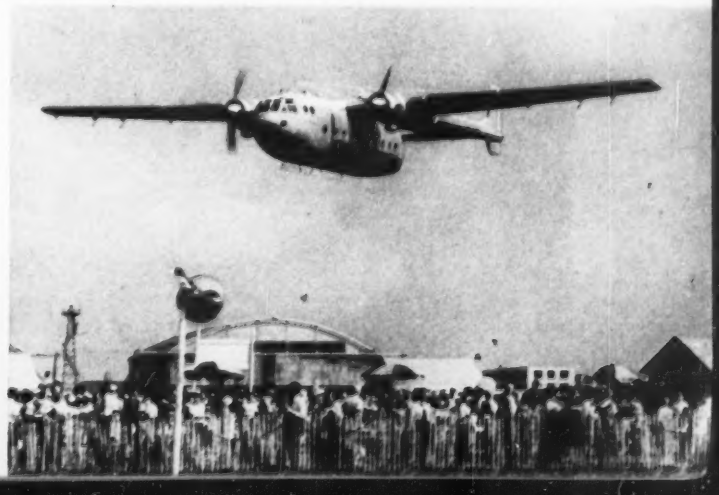
Hawker Hunter F.1.—The weight of the Hunter was quoted by the commentator as of the order of 13,000 lb (which seems too low to be true), and the armament as four 30-mm guns.

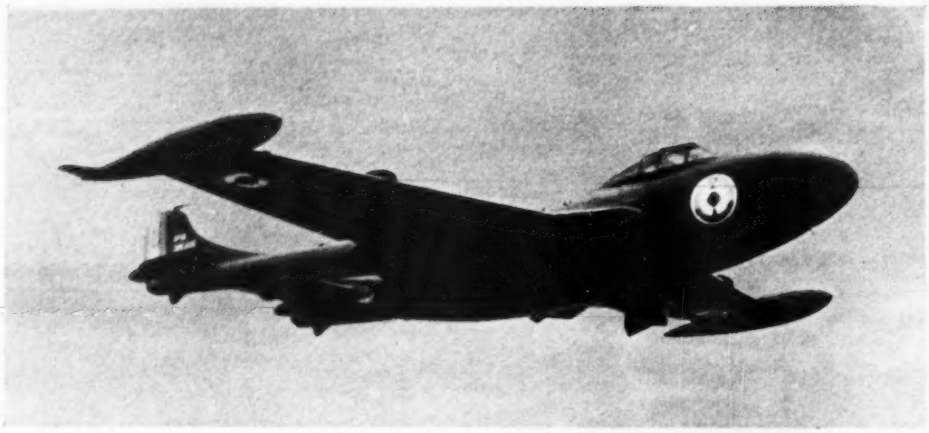
Vickers-Supermarine Swift F.4.—Looking much like the beautiful model illustrated in *Flight* last week, Swift F.4 WK198 had a high-gloss blue finish and displayed various minor modifications. There are now four wing fences, *à la* Mig-15, and various small intakes in the fuselage are of the flush N.A.C.A. form. Ports for four guns are in evidence.

Avro Shackleton.—On July 3rd a mission of French naval officers, thirty strong, was accorded a conducted tour of this anti-submarine aircraft. At their head were Admiral Nomy, Chef of Aéronavale, and Admiral Ruyssen. The Shackleton is an obvious replacement for the reconditioned maritime-reconnaissance Lancasters delivered to the French some months ago.

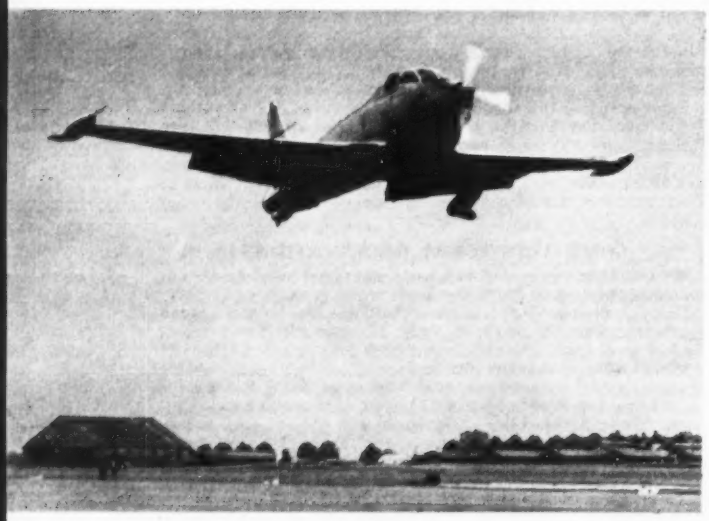
S.O.9000 Trident.—This supersonic research aircraft is S.N.C.A.S.O.'s 18th prototype since the liberation and its 8th turbine-powered prototype, having followed the S.O.6000 Triton, the S.O.6020 Espadon, S.O.M.2, S.O.1120 Ariel helicopter, S.O.4000 bomber, S.O.30 Nene, and S.O.4050 Vautour. Designed by M. Servanty, it was first flown by Jacques Guignard at Melun-Villaroche on March 2nd this year. Its purpose is to provide data for the construction of a supersonic intercepter and it was completed within fifteen months of the order being placed by the

(Left) Weighty argument against submarines—the Avro Shackleton M.R.2, pilot Johnny Baker. (Right) The Nord 2501 Noratlas progresses well on one of its two Bristol Hercules. Four similar machines flew over in excellent formation.



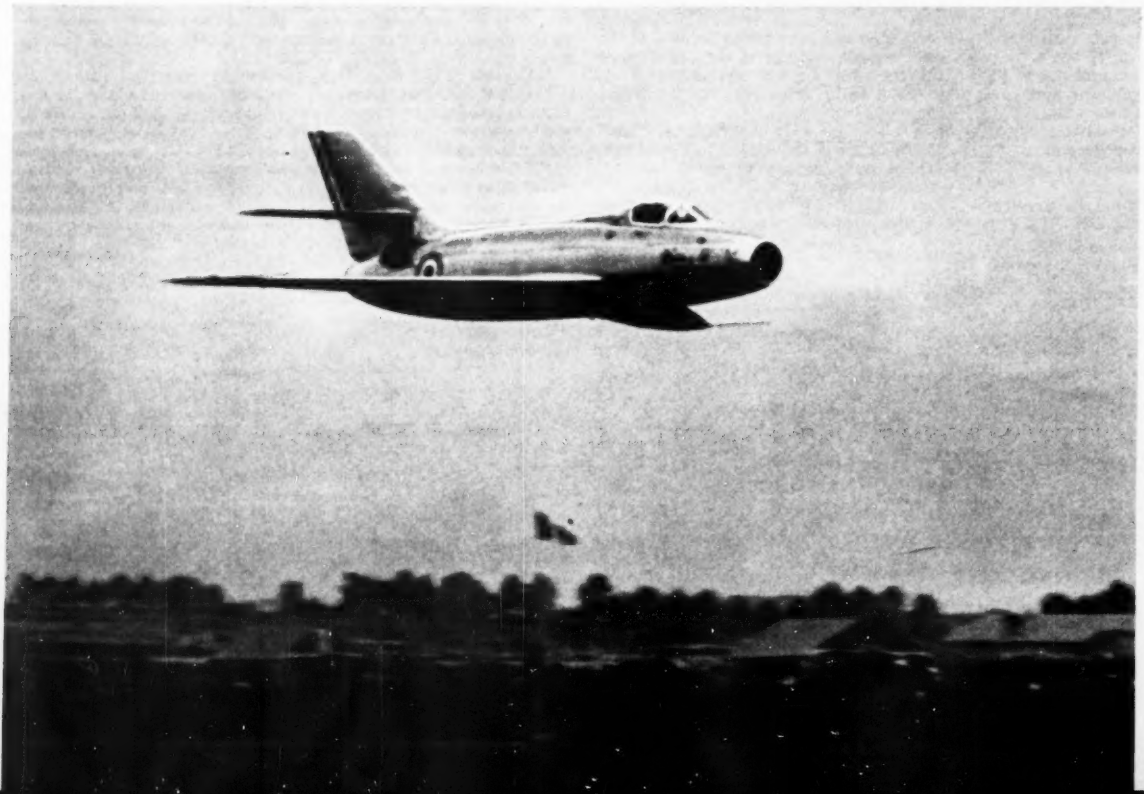


The S.E.-built de Havilland Sea Venom, pilot Lecarme.



(Left) The Bréguet Vultur gets going on Nene and Mamba power. (Above) Aspect ratio epitomized by the Hurel-Dubois H.D. 31 transport.

(Below) Colonel Rozanoff at speed on the Marcel Dassault Mystère IV, with Hispano Suiza Tay. Shortly before this picture was secured the Mystère had noised abroad its supersonic capabilities.



LE BOURGET 1953 . . .

Secretariat d'Etat à l'Air. The forward portion of the fuselage, containing the cockpit, is jettisonable in flight. The main propulsive unit is an S.E.R.P. rocket in the rear of the fuselage, but to date only the tip-mounted Turboméca Marboré turbojets have been utilized. Irreversible hydraulic controls are fitted and, as diligent readers will already know, the tailplane has negative dihedral. Various features such as the controls and rocket unit have been tried out on prototypes of the Espadon family, and the "sandwich"-type construction employed has been the subject of considerable study by the enterprising S.O. organization.

S.O.4050 Vautour.—Few flights—about 20 it is understood—were made by this twin-Atar fighter/bomber before it exceeded Mach 1 in a dive. Extensive use is made in its structure (as in that of the S.O.9000 Trident) of metal-to-metal and metal-to-wood bonding. "Sandwich" and "honeycomb" forms of construction have also been developed. The Vautour weighs about 33,000 lb and, equipped as a light bomber, has a range of about 1,240 miles. With auxiliary tanks it is said to be capable of flying the Atlantic and its bomb bay is capacious enough to take an atomic weapon. The French Government have lately placed an order with S.O. for a pre-production batch of Vautours among which there will be several versions, variously powered. One machine will have Armstrong Siddeley Sapphires.

S.O.1310 Farfadet.—This "convertible" made its first flight on May 8th and since that time, pending delivery of its Turboméca Artouste II turboprop, has flown on a number of occasions as a helicopter, on the power of a Turboméca Arrius II, which supplies compressed air to the burners at the rotor tips. The first flight as a true "convertible," with both engines operative, was on July 1st, and this occasion is believed to have been the first on which an aircraft has flown with both "helicopter" and "aeroplane" propulsion. A large transport helicopter with 25-30 seats is to be built in the light of experience with the Farfadet.

S.E.3120 Alouette.—It was announced during the Salon that this three-seat multi-purpose helicopter, piloted by Jean Boulet, had beaten the world's closed-circuit distance record for helicopters of all categories (formerly held by a Sikorsky R-5A with a distance of 1,000 km) by covering 1,252 km over the Buc-Etampes-Rambouillet-Buc circuit. The first congratulations received by the company came from the Sikorsky concern, with whom a close technical liaison is maintained. S.E., of course, hold a licence for the S-55.

M.D.316.—This trim-looking light transport is a development of the 315 but has a single fin and rudder and is powered with two SNECMA 14X engines of 820 h.p. It first flew on July 19th last year. Due to the increased airscrew diameter the undercarriage is taller than that of the M.D.315. Accommodation can be provided for 15-18 passengers.

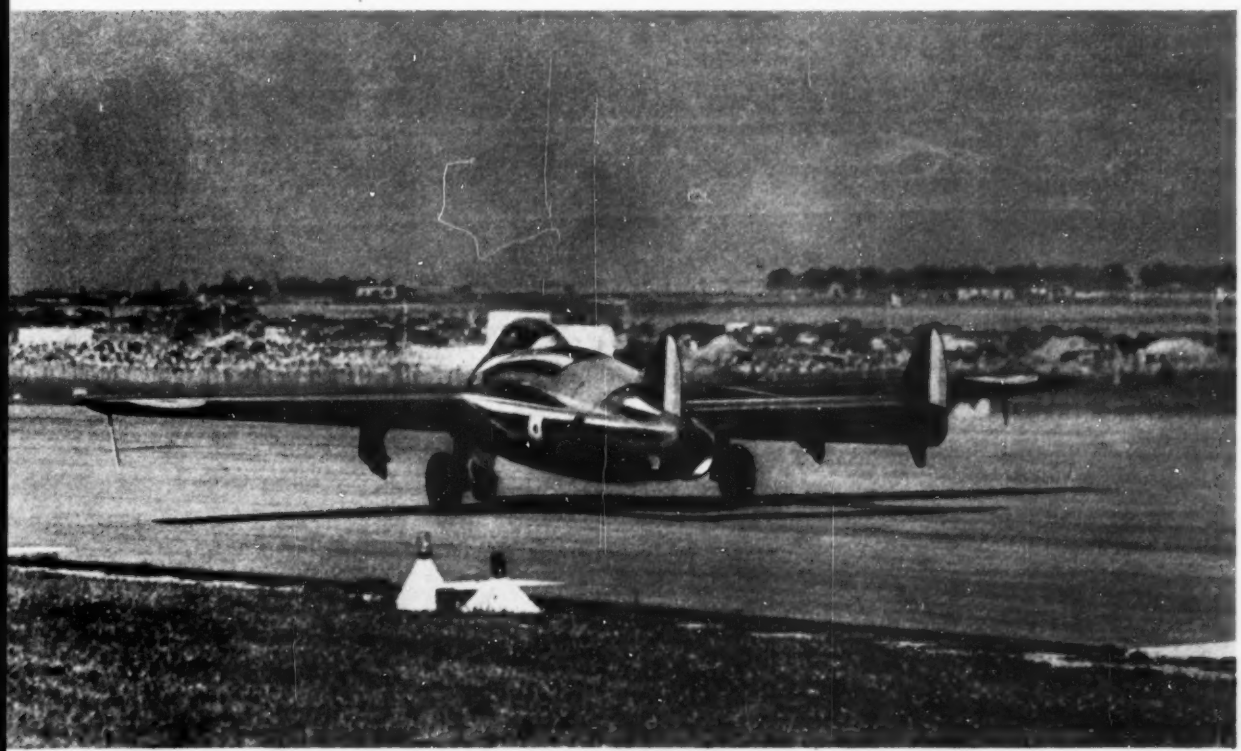
Potez 75 ground-attack aircraft—a guided missile platform.

S.O.30P (flush-intake Turbomécas).—Compared with the usual type of auxiliary jet with frontal intake the flush-intake S.O./Turboméca installation, seen on this aircraft, is claimed to reduce the drag of the jet pod by 25 per cent. Moreover, the air does not enter the pod while the aircraft is flying with the jet units cut out; thus, there is no free-wheeling and wear and tear are commensurately reduced. Drag is not increased by air entering the pod, and the possibility of foreign bodies, such as stones, entering the jet at take-off is lessened. Relighting in flight, even in heavy rain, is greatly facilitated, and icing hazards are said to have been practically eliminated.

N.C.856A.—During the course of the Salon twin flat-topped floats were exhibited with this A.O.P.

Max Holste 1521 Broussard.—The following data apply to this light "bush" transport, the prototype of which was demonstrated: span, 44ft; empty weight, 2,196 lb; gross weight, 3,202 lb; top speed, 174 m.p.h.; cruising speed on half power, 146 m.p.h.; take-off run, 410ft; range, 750 miles.

"Going astern"—jet deviation demonstrated by a French Vampire. A second—standard—Vampire landed simultaneously for comparison.



THE WHEELS UNDER THE WINGS

Specialized Vehicles and Ground Equipment of the R.A.F.

IF the Chief of the Air Staff himself were to act as conducting officer to a visitor viewing the assembly of ground vehicles at Odiham, we venture to suggest that he would need guidance from the respective officers or N.C.O.s in charge to make known their many purposes and the units or branches they represent. Officers at Odiham in charge of arrangements for the Royal Review admit that they have learned a great deal about the Air Force in the last week or two, and that they have discovered men and equipment of whose existence they had no previous knowledge.

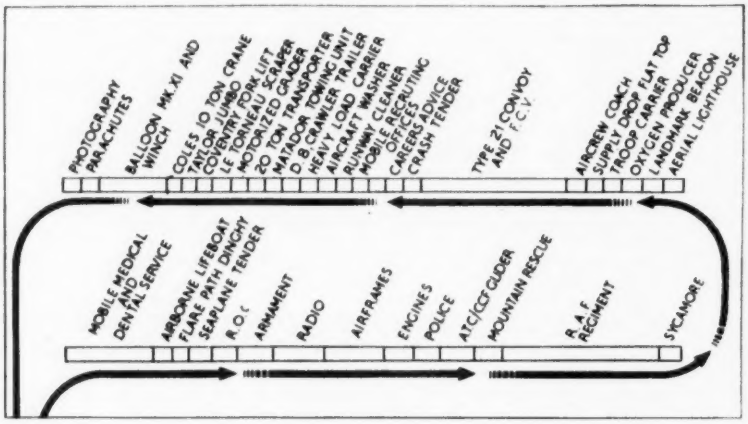
Because *Flight* suspected that the R.A.F. special vehicle and equipment park would have much to reveal to those whose interests are usually more closely concerned with flying and aircraft, we paid a visit to Odiham last week to see how the preparations were going on, and without intending to sound too much like a recruiting officer or a C-in-C. boosting his Command at a public dinner, we would first report that we found everyone smart and in excellent spirits, swearing and singing as they polished and painted as only happy airmen can. They were immensely proud of, and interested in, their strangely assorted machines, as was made plain by their eagerness to explain them and in some cases to demonstrate them.

As yet the vehicles are not assembled for review but are mainly grouped about in the right areas for final preparation and removal of grime picked up on their road journeys to Odiham. Their final positions on the right flank and to the rear of the aircraft is shown on the main and detail plans. The positioning has been no easy task in view of the size and weight of some of the equipment, and the lie and weight-bearing qualities of the ground.

The Service guests and the handful of the public who will be lucky enough to visit Odiham for the Queen's Review of the Royal Air Force will, we feel sure, be well rewarded if they find time to visit these important ground units. They are all essential components of that background which is so important to the more spectacular operations of their airborne brothers in blue. Unfortunately, it will not be possible for most of the men to demonstrate their speed and skill in their work, which may be making a runway, trapping a saboteur, stopping an epidemic, carrying out a hazardous rescue in mountainous country, or on the sea, radar-directing a fighter on to its target, or simply spreading the R.A.F. gospel to the public. There follows below an account of some of the more unusual individual vehicles and teams of vehicles which we have recently examined as they assemble at Odiham.

An important part of the ground-equipment static park will be devoted to the work of Technical Training Command, who will be showing, by trades, examples of current equipment, much of it sectioned as for instruction. The engine display will comprise four representative turbojets, for example, and similar appropriate equipment will represent airframes, radio, armament, photography (including a field processing-unit), and so on.

In pleasant contrast will be the Coastal Command exhibits of airborne lifeboat, seaplane tender, and flarepath dinghy, the latter a most attractive little boat. Also from this Command comes the Mountain Rescue team and its equipment. As one would expect of them, a most enterprising display is to be prepared for the Queen's Review. Unfortunately, there are no mountains at Odiham, and therefore, we learn, a model is being erected of a mountain area familiar to the Queen, and with its aid techniques will be demonstrated.



Plan for the static display of specialized vehicles and ground equipment.

The familiar vehicles associated with barrage balloons, and the trailer and winch as used for Kirby Cadet 3 gliders of Home Command will also be present. The majority of the specialized vehicles now to be mentioned are from Maintenance Command.

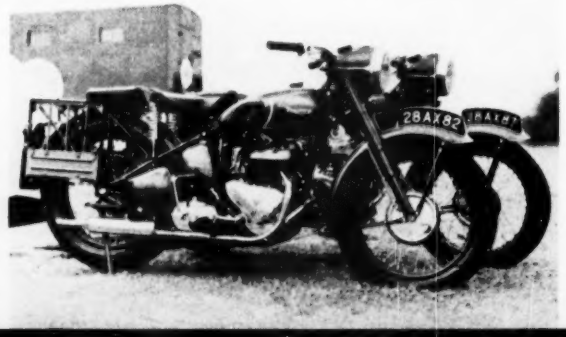
Aircraft-washing Plant: A completely new piece of equipment of which much may be seen in the future is the aircraft-washing plant which has been designed and produced in the R.A.F., and is mobile for towing, having been based upon a modified bomb trolley. Basically, it comprises tanks, pumps, heater and attachments for spray nozzles. It does not carry its own power supply, and is therefore dependent upon an outside source for electric power for its pumps.

Washing units have become necessary not only because of the importance of cleanness to the performance of modern aircraft, but also to combat corrosion. The principle of the cleansing is as follows: First a liquid known as Stripolene is sprayed over the aircraft with the aid of up to five spray nozzles, each handled by an operator. These nozzles have wooden handles and are some 6ft long. The Stripolene is left on the surface of the aircraft for about two hours, during which time it dissolves or loosens all grease and other dirt. The next stage involves the washing-down of the aircraft with Peptate mixture. This neutralizes the effect of the Stripolene, washes off the aircraft and is at the same time self-drying. These two applications complete the cleansing operation.

The washer not only carries storage tanks for the two liquids mentioned, but also heating equipment with its associated paraffin tank and a mixing tank for the Peptate which is applied warm and liberally mixed with water. The water must be provided from an outside mains source, the requirement being 10 gallons per minute. This rate of flow, incidentally, indicates the kind of heating requirement from the paraffin burners.

Fork-lift truck and Jumbo and Coles cranes beside (left) a new Bedford 29-passenger aircrew coach.

Smart new Triumph 500 c.c. side-valve twins for the R.A.F. Police.



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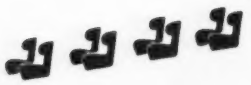

Communications—rearward facing seats for eight passengers.

Six stretchers for casualty evacuation.

Freighting of supplies and spares, capable of accommodating a jet fighter engine.

Parachuting supplies through large cabin door opening.

Dual controls for twin-engine pilot training.

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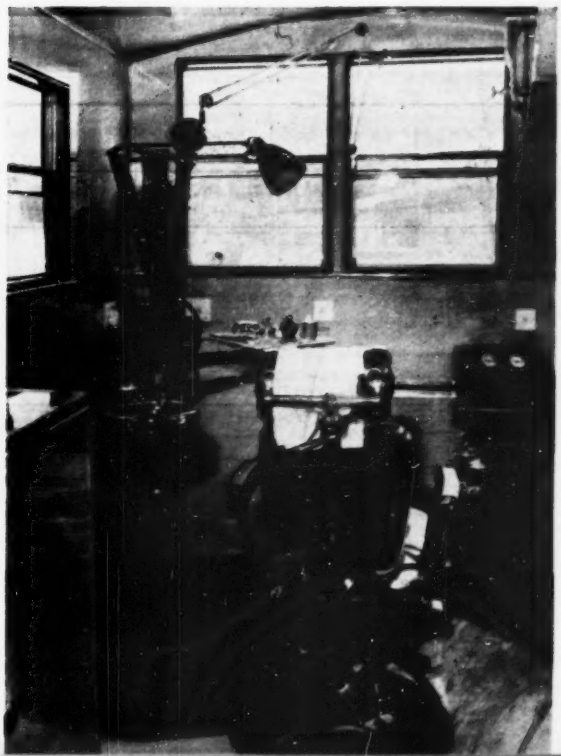
THE WHEELS UNDER THE WINGS . . .

With one filling of cleaning liquids this relatively small washing-plant can look after an aircraft of the size of the Hastings. The time depends upon the number of operators, the maximum being five. During spraying the plant itself needs no attendant. Tests of the equipment are now more or less complete, and production versions are soon to be issued to units.

Mobile Oxygen-producing Unit: A massive and impressive two-vehicle unit is available for charging oxygen cylinders as held by most flying units when there is a special demand, such as during air exercises (with squadrons operating away from their bases or at forward strips) or in emergency.

The plant is charged with some 100,000 cu ft (atmospheric) of liquid oxygen at −172 deg C by the British Oxygen Company. In more normal liquid units its spherical tank holds some 128 cu ft, or approximately 800 gall. With the aid of the plant the gas can then be delivered where required as dry, clean, breathing oxygen under pressure suitable for the storage cylinders. The vehicles themselves are basically an A.E.C. Matador towing a special S.M.T. trailer with 16 small wheels. The Matador itself carries a 150 h.p. Perlaphone diesel generating set to provide power for the oxygen compressors and the water pumps. The trailer carries the spherical container already referred to, plus pumps, filters, compressors and the cooling system and water storage tanks for the compressors.

Somewhat unexpectedly a captive balloon is also carried which is about half the size of the normal barrage balloon. This simply acts as a gasometer to look after the oxygen which evaporates and, so far as possible, helps to avoid wastage. Oxygen which enters the balloon can be taken back through the compressor into storage.



The compressors for the oxygen bottles are of four-stage type and normally charge the bottles to 3,600 lb/sq in. The maximum capacity of the pumps is 6,000 lb/sq in. An interesting point, familiar enough to engineers concerned with this sort of oxygen equipment, is that the internal lubrication of the oxygen pumps is effected by distilled water.

We understand that there are three oxygen-producing units of this kind, the one on show which comes from the Cardington civilian M.U., another in the Middle East, and one in the Far East.

The particular system used for the unit is really more suitable for large static plants, and some newer equipment is likely to become available soon which will actually produce oxygen from the atmosphere.

The crew of the oxygen-unit comprises seven: two corporals for the diesel engine and generating plant; one corporal for the oxygen-pump valves; one corporal for the discharge points; one airman for the moisture-filter valves; and two airmen for handling the large storage bottles from the units being served. In addition there is the N.C.O. in charge and the driver of the Matador.

Coles 10-ton Crane: The sergeant who described this lorry-mounted crane to us wore the wings of an air-gunner and of the Pathfinder Force. The vehicle concerned is an A.E.C. Centaur with six-cylinder diesel engine giving 95 h.p. at 1,800 r.p.m. The power unit for the crane is a V.8 Ford (or it may be a Perkins diesel) giving 47 h.p. at 1,800 r.p.m. Its maximum load of ten tons can be handled over a 9ft radius with chassis outriggers lowered. When mobile, the maximum load is seven tons.

The Coles crane is used principally in the R.A.F. at maintenance units and at bomb dumps, and when required elsewhere is sent out on loan from the M.U.s. The crew of two comprises driver and crane operator. On the road the maximum speed is 18 m.p.h. These cranes have given excellent service for some time past, and it is expected that they will be supplemented soon by cranes of larger capacity.

Taylor Jumbo: This is a mobile jib-crane of up to three tons lifting and carrying capacity. The whole operation is from the cab, and the R.A.F. version is powered by a 40 h.p. Perkins P.4 diesel. It is produced by F. Taylor and Sons, Mfg., Ltd., of Salford. Elevation is by two hydraulic rams, and the maximum weight of 60 cwt is lifted in the rear position; from the front the load is 40 cwt. A 25 cwt extension for the jib can be used in any position. The jib does not rotate.

Although the crane is mobile and has single steerable back wheels, it is not intended for use on the road, having no springs. It is normally to be found in hangars and warehouses, and has been in service with M.U.s for rather more than a year. The Scots sergeant in charge felt that it was a very efficient unit.

Coventry Fork Lift Truck: A familiar vehicle in M.U.s is the fork lift truck produced by Coventry Climax. Its particular purpose is for dealing with large stock-piles. It can carry up to 4,000 lb with tilt, and lift it to a maximum height of 12ft. Its four-cylinder diesel engine, giving 35 b.h.p. at 2,400 r.p.m., provides power for crane and mobility. The truck has rear-wheel steering and two forward and two reverse gears. Maximum speed is about 6 m.p.h., and the weight is 4¼ tons. It can be provided with crane attachments.

Aveling-Austin Motorized Grader: Some of the most remarkable vehicles to be seen in this country are the property of the Airfield Construction Branch of Maintenance Command. The 99-H grader is indeed a strange vehicle to those unfamiliar with the work it can handle, although the Invicta-and-horse

Attractive? Interior of the No. 303 mobile dental surgery—mainly for use overseas.

An Aveling-Austin motorized grader in action. (Right) The remarkable all-electric-controlled Le Tourneau scraper. It has a supercharged two-stroke Diesel engine.

THE WHEELS UNDER THE WINGS . . .

trademark on its nose may not be new to them. The example at Odiham has been driven down from R.A.F. Church Lawford, which is the U.K. depot of the Airfield Construction branch.

Whether grading or handling light bulldozing and angle-dozing, one driver/operator is required. Power is provided by a six-cylinder Leyland diesel giving 100 h.p. at 1,800 r.p.m. The control of the blade is entirely hydraulic, and in view of the precise movements in every direction, including horizontal and vertical angle, traverse, and pitch, it occurred to us that the designer of the equipment might be very valuable in the helicopter business. We hope that the driver will be available on the 15th to demonstrate his vehicle to visitors. Its road speed is 13 m.p.h. normal and 19 maximum, and working speed depends upon the job in hand. This Aveling-Barford product also carries a scarifier. It is 24ft 3in long and weighs 11 tons. Having four-wheel steering, its radius of turn is as small as 30ft 10in.

Le Tourneau Motorized Scraper: The Americans are experts in heavy vehicles for clearing rough country and building roads and airfields, and it is from R. G. Le Tourneau Inc. of Illinois that this enormous vehicle has been sent to the R.A.F. Its purpose is for cutting landing-strips in conjunction with other vehicles by removing top soil to formation level, and it is able to transport away a load of 14 tons of earth and to dump it as required for filling or other disposal.

Having examined the 186 h.p. supercharged six-cylinder two-stroke diesel, which is a General Motors product, visitors may next interest themselves by studying the drive through generator to gearbox to enormous front driving wheels. Then they may try to discover what constitutes the basic chassis of the vehicle, for the entire engine is cantilevered forward while the trailing back wheels appear only to support the "bowl" or soil-container. It is surprising to learn that the maximum speed of this enormous contraption is 32 m.p.h. in its fifth, overdrive, gear. In very heavy soil and when working at full capacity, provision is made for it to receive an extra shove at the back from another vehicle. Its maximum weight with full bowl (14 cu yd) is approximately 30 tons.

Sergeant Strickland, who has taken a special course on these vehicles, drove to Odiham in the "Turnapull" (as it is named on its nose) in a convoy of other vehicles, and found that it was easily controlled and most flexible, bearing in mind its size. The entire machine is controlled electrically, and it has no steering-wheel. Directional control by differential steering of the main driving wheels is obtained smoothly and rapidly by no more than a touch on a small switch. The switch is mounted to move transversely, and in the correct sense on the instrument panel, the sprung mid-position being neutral. Electric switches also control the attitude of the bowl, the position of the apron or front gate of the bowl, and the movement of the tail gate, which is, in fact, a ram to push the soil forward out of the bowl as required (with apron up).

The vehicle is 33ft 3in long, 10ft 7in wide, and the heavy-duty Firestone tyres are 21 × 25in section. The engine starts as easily as would that of a well-kept car, and is remarkably responsive for its size.

Crawler Tractor: Before turning from heavy construction equipment a brief reference may be made to the huge D.8 Caterpillar tractor, a product of the Caterpillar Company of America, which is carried on a 40-ton plant transporter, and of the towing unit which is a Scammell product. The D.8 tractor carries a large blade for heavy bulldozing, and also has towing attachments for scrapers or tree rooting. It weighs 17 tons and the blade is under hydraulic control. The maximum speed is 4.9 m.p.h., and the drawbar pull is 26,208 lb.

Landmark Beacon: In quite a different class from the foregoing is the mobile landmark beacon which is trailer-borne (J.B. and Co., Ltd.) and is the modern version of what in wartime was known as a Pundit. Its purpose is to give a flashing two-letter identification from its red neon tubes. The power is provided by a Coventry Climax generator set, although attachments are provided should an external power supply be required in emergency. Once started, it needs no attendant for a night's operation, but continues to push out—in the case of the vehicle at Odiham—"O M" as dictated by the cam plates controlling the electric contacts, driven themselves by a small electric motor. The eight neon tubes are each separate, but provision is made for using only two or four at a time should this be desirable.

Aerial Lighthouse: Another piece of equipment for night-flying and also trailer-mounted is the aerial lighthouse produced by Chance Bros. of Smethwick. This also employs a standard Coventry Climax generator set, and is one of the more familiar towed vehicles to be seen at airfields.

Heavy-load Carrier: Although this title is descriptive, it would not necessarily bring to mind a fine, sturdy-looking Leyland 10-ton lorry. The particular model to be displayed has four driving wheels and power is provided by a Leyland Hippo diesel of 9.8 litres capacity and giving 125 b.h.p. at 1,800 r.p.m. A point of interest is the provision of four separate trailer brake connectors at the back: one for pressure air brakes; another for vacuum; a third for an opposed combination of the two (a system found on 20-ton trailers) and the fourth for 24V electric systems. Used in conjunction with this vehicle might be the Hands 10-ton multi-wheel trailer which has four double wheels.

Hangar Cleaner: A smart little blue vehicle which will catch the eye in passing is the brush-type sweeper collector designed for hangars and tarmac and known as the Lewin (Victoria Works, West Bromwich) Universal Model.

Mark V Fire and Crash Tender: One of the smartest vehicles to be displayed is also the newest in its class in service. It is the Thornycroft Mk V crash and fire tender. It consists of a Thornycroft "Nubian" four-wheeled-drive cross-country chassis fitted with a Rolls-Royce Mark IID eight-cylinder petrol engine and crash tender body with fire extinguishing equipment by the Sun Engineering (Richmond) Ltd. The power unit develops 160 b.h.p. at 3,750 r.p.m., and power is transmitted through a main four-speed gearbox and thence to a two-speed transfer box fitted amidships which distributes the drive to the front and rear axles, the hubs of which incorporate epicyclic gearing. Minimum ground clearance of 13 inches is provided.

A "Sun" 2,300 g.p.m. foam pump and a second 200 g.p.m. pump for water are driven by means of a power take-off from the chassis transfer box and main gearbox respectively. The capacity of the water tank is 400 gallons and that of the foam compound tank 70 gallons. The total foam output without replenishments is 5,880 gallons, or by using two 500 gallon water tenders the total foam output can be increased to 20,500 gallons.

The sergeant in charge had happily not had occasion to use the vehicle, either for an aircraft crash or for a fire among station buildings, but he said that for covering ground the control and springing were the best he had tried of any kind. On roads and runways, in spite of its size, it can achieve 65 m.p.h., and even over a rough airfield 35 m.p.h. is quite possible. We understand that nearly 100 of these fine vehicles are now in service at the larger operational stations.

A crew of six is carried, including the driver, who is also the pump-operator (most controls being handy from the driver's seat). A full complement of rescue equipment is carried, including CO^2 cylinders and asbestos and leather suiting. The loaded weight is 10½ tons.

Aircrew Coach: With memories of some of the vehicles used for transporting R.A.F. personnel during the war, we do not hesitate to say that the new 25-passenger Bedford is a smart and luxurious coach. The one on display is one of the first of its kind in service. It is based on the Model S.B. coach chassis by

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Vauxhall Motors, and a six-cylinder Bedford petrol engine is fitted.

Police Vehicles: The R.A.F. Police use a variety of vehicles of which representative types will be displayed. Already at Odiham are two of the smartest Land Rovers which we have seen in service. They carry as much chromium-plate (including that on the bumpers) as a private car, and as one would expect, are kept in first-class condition. In addition, two brand-new Triumph T.R.W. 500 c.c. side-valve twins will be shown. Trainees learn on various types of motor-bike, particularly Nortons and Ariels. The motor-bikes are used mainly for convoy duties. For other transportation duties the police use 15 cwt Bedfords, Hillman cars and—mainly overseas—Vanguard estate wagons. Police dogs are carried in three-ton trucks.

The R.A.F. Regiment: The Home Command display gives prominence to the R.A.F. and R.Aux.A.F. Regiment. Detachments of No. 15 and 16 Light Anti-Aircraft Squadrons will be present, each with two 40 mm Bofors guns and their vehicles, and with two Land Rovers and two motor-cycles. Normally, the smallest unit of a squadron would have three guns, but at Odiham there are representative detachments. In addition, these squadrons have four Thornycroft three-tonners serving as gun-towing vehicles. When moving, the guns are normally clamped and the gunners ride in the towing vehicles, but this is not essential and the gunners may be towed while occupying their seats with the guns in readiness to defend the convoy.

The Land Rovers are normally allocated to squadron and flight commanders as recce vehicles, the strength being three per squadron.

Under the wing of Technical Training Command the Regiment have a Rifle Flight with arms and equipment, and two Humber light-recce vehicles with their crews. Their mortar detachments are each equipped with 15 cwt transports—both Bedfords and Fordsons being used—and the Rifle Flight also employs Thornycroft three-tonners. A new one-ton Austin vehicle is expected soon, we learn.

Mobile Recruiting Office: Recruiting vans will be among the more familiar vehicles to the general public, and they have been used for many months past. They carry an officer, a warrant officer and a corporal driver, and move from town to town giving information and talks on life in the R.A.F. and showing films (with the aid of a 16 mm projector) about the Air Force and its equipment. Naturally, they are prepared to give the fullest information on conditions of service and similar subjects.

At exhibitions and displays a mobile recruiting vehicle may be accompanied by a mobile exhibition trailer of the sort to be shown at Odiham. The sides of the trailer fold down to form part of the exhibition; a sectioned Derwent turbojet forms the centre-piece, and mounted at the four corners are scale models of modern military aircraft. The recruiting office is mounted on an Austin three-ton six-wheeler which tows a small two-wheel petrol-electric generator trailer.

Careers Advice Van: This vehicle supplements the work of the previously mentioned ones, but on the other hand has a very different job. Its purpose is to visit R.A.F. stations and to give advice to men and women already serving regarding their careers in the Service. Subjects which may be discussed are chances of promotion in the various trades, extension of periods of service, personal records, and so on.

Type 21 Radar Convoy: This important and impressive unit comprises basically seven vehicles and its duty is to co-operate with fighter squadrons in the capacity of mobile G.C.I. unit. In addition to these seven vehicles, two more would normally be required to provide two-way V.H.F. communications between unit and aircraft. Two vehicles carry aerials: one a Type 14 azimuth scanning head; the other the Type 13 of nodding type for the height scale. These are each self-contained for transmission and reception, and they feed the information they obtain to the operations vehicle which contains plotting tables, control positions and, of course, the cathode-ray tube displays. Supporting these vehicles are three mobile power units: two for use at any one time, and one in reserve. The final vehicle is a mobile workshop equipped with benches, small tools, power supplies, and so on.

Inconveniently for those who must maintain them, the vehicles in the Type 21 convoy are of several types. The power vehicles are four-wheel Thornycroft three-tonners; the workshop is carried on a six-wheel Fordson three-tonner; the ops. vehicles are A.E.C. Matador four-wheelers; the aerial heads are carried on American Mack chassis (the all-up weight of these last-named vehicles is in the region of 15 tons each) while the V.H.F. trucks, which may also tow trailers, are Austin three-tonners.

Medical Vehicles—Mass Mobile X-Ray Unit: One of the most interesting displays will be that of the R.A.F. Medical Services, among which is the R.A.F. Mass Mobile X-Ray Unit comprising three vehicles: an X-Ray van, dark-room and office, and the medical officer's consulting room, together with his senior N.C.O.'s office. The X-Ray vehicle is basically a Queen Mary with Crossley 4 by 4 Donkey prime mover. The Service name of the unit at Odiham is No. 2 C.R.S.S., which stands for Chest Radiography Sub Section. It is one of two, and the other is now on the road in Scotland.

The staff normally comprises a squadron-leader radiologist, one senior N.C.O. medical admin., one radiographer, one W.R.A.F. photographer, one airman photographer, one W.R.A.F. typist, one W.R.A.F. clerk org., and two admin. orderlies. With this staff of nine, 500 photographs can be taken in a day, including retakes where needed. Thus, only a few days would be needed at any one station, and the results can be known in a matter of hours. The Odiham unit, which used to be No. 1, has been in action since 1942. After the Royal Review it is going on a tour of stations in the Midlands and West Country.

Mobile Decompression Chamber: Another interesting medical unit is concerned with the mobile decompression chamber. It is the only one of its kind in the R.A.F., and it is borne on an 11-ton A.E.C. diesel vehicle which also carries a diesel electric generator set to supply power for the vacuum pumps for the chamber. The chamber itself is carried on a Templewood eight-ton trailer which is 22ft long and 9ft 2in high.

The purpose of the unit is to test aircrews and to give them prior experience of high-altitude flights and the effects of oxygen lack. The chamber seats six, and aircrews are "taken" to 37,000ft for one hour for tests of annoxia and bends. The operator sits in a cabin in front of the chamber and views the "victims" through portholes. Normal intercom is employed and oxygen is supplied from 750-litre cylinders, stored in banks of twelve on each side of the chamber, *via* standard aircrew masks.

This unit is normally based at Halton, but recently has co-operated with the School of Aviation Medicine at Farnborough and it is also being used for training operators of other static equipment.

Mobile Laboratory: The duty of this vehicle is to look after station epidemics, and similar vehicles are already in use in the Middle East. It is equipped as required to attack the particular epidemic to which it is being despatched. The model for the Review is assumed to be ready for a bacteriological outbreak of, say, typhoid, but at any time it can also look after such things as blood transfusions. The unit is based at Halton and is a sub-section of the Institute of Pathological and Tropical Medicine, and its principal work is found abroad. The crew usually comprises one laboratory officer, a senior N.C.O. and two lab. technicians (the name used to be laboratory assistants).

Mobile Dental Surgery: It is more convenient and economical to send the dental officer and his surgery to the small outlying units, particularly overseas units, than it is to send the men and women to the surgery. A mobile dental surgery and laboratory has therefore been designed which is capable of pushing-out to units in the desert or operating in the field immediately behind the front line. All normal dentistry can be undertaken and, should it be necessary, the vehicle can provide its own emergency lighting and has a built-in water-tank of 60-gall capacity. Normally, however, water, power and a telephone line would be provided from outside. In the field the electric source would be a trailer-mounted 2.5 kW generator, and a mobile tanker would provide the water.

The crew comprises the dental officer and corporal assistant, and the driver of the vehicle. The mobile surgery contains such equipment as an electric water-heater and sterilizer, fountain spittoon, pump-up dental chair, as well as the familiar instruments of torture driven by an electric dental engine. At one end there is a small work-bench. For cold climates wall-heaters are built in, and the vehicle is double-walled and carries fly-screens and fans for air circulation for tropical countries.

The dental surgery is self-propelled, being mounted on a Fordson three-tonner. The body was built by Elliotts, Ltd., of Reading. The vehicle was modified to its present standard last year by Spurlings, Ltd., of Hendon, and it now incorporates most of the recent ideas for the development of a new series of mobile dental surgeries.

Parachute Vehicles: That there are mobile parachute sections may come as a surprise to some people. Two 35-ft vehicles are employed, positioned end to end. A third vehicle is required to transport drying and heating plant and to blow hot air into the first two vehicles. Instead of hanging them, parachutes are wrapped round rails.

Royal Observer Corps: Although there will be more aircraft to observe and identify in the Odiham area on July 15th than ever before, it will not be easy for the Observer Corps to demonstrate spotting and plotting with their aid. However, some 20 members of the Corps will be present with a pre-fabricated concrete observation post.

Our American Correspondent Reports . . .

A WEEK or so ago it was announced that one of the new R.C.A.F. Comets was to land at New York and Washington. There was immediate interest from both the airlines and the public, and as the V.I.P. equipment on these aircraft is said to be particularly attractive, it looked like a wonderful opportunity to show this aircraft off to advantage. But, up to the time of writing, anyhow, this is about as far as the proposal seems to have got (although the aircraft has flown from Ottawa over New York without landing). Inquiries as to the whys and wherefores of the delay have produced a not altogether satisfactory response, for it is said that the Port of New York Authority, which body is responsible for Idlewild, LaGuardia, Newark and Teterboro airports, put its foot down on account of the alleged noise problem. The result is—or was—that the R.C.A.F. were faced with either going into the U.S.A.F. base at Mitchell Field, or abandoning the whole idea.

Although this particular matter is one to be fixed up between the R.C.A.F. and the local authorities, it does raise some pretty important questions of principle and precedent, and a precedent, what's more, that could have some explosive international aspects. The fact being that a local emotional situation could interfere with international traffic. Suppose, for instance, B.O.A.C. had announced their intention of bringing one of their Comets into Idlewild, would the port authority have refused permission? And if they did, what would B.O.A.C. have said and done about it? And has the port authority the right to prevent an aircraft landing at an international airport, provided that aircraft complies with its own domestic airworthiness requirements, as well as the current international regulations? These are all questions that spring immediately to mind. Yet in this particular case the unhappy position of the P.N.Y.A. must be appreciated. Obviously they want as much traffic into their aerodromes as possible and would, in ordinary circumstances, be the last to try and prevent a Comet coming here. But, as has been pointed out in these News Letters before, they are not faced with ordinary circumstances, but with a highly explosive situation which could (such is the power of hysteria) close up their airports altogether. And they are frightened that the extreme elements, hearing that a jet transport is to land and take off, would use this to touch off another situation similar to that which closed Newark for nearly a year. This, they feel, is too great a risk.

But to capitulate in this fashion seems to the writer to be highly dangerous. It not only sets a precedent, but by virtue of their decision there is a tacit admission that jets are too noisy to be flown around New York. How, therefore, will they compete with the next occasion? At some time or another they will be faced with giving a "Yes" or a "No" to a commercial organization—and it doesn't seem likely that when that day comes jets will be any quieter than they are now, or the New York residents better educated or more docile. Which brings up the final point—how noisy, in fact, would the Comet be, taking off from the long runway (perhaps out towards the sea) at Idlewild, and would it be so different from a, say, DC-6? There would also be a considerable amount of publicity surrounding its arrival. And noise or no noise, there would be a British-built, Canadian-operated jet transport at Idlewild as an example of commercial progress.

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THE announcement that Rolls-Royce had come to an agreement with Westinghouse to help to further develop the latter's engines hasn't had much publicity here, despite the fact that there had been rumours of trouble at Westinghouse for some time, and the Navy programme was said to be delayed, and U.S. naval aircraft not giving their anticipated performance, because of it. The aviation press mentioned it, but some of them refrained from pointing out that Rolls were to receive financial payment for their aid, or that they were to give active assistance in the development of some of the current Westinghouse types. In fact, one announcement was sufficiently emasculated to make it possible to read into it that it was Rolls who were to receive the help! What the agreement means in actual practice is not made clear, but it appears to be a most satisfactory arrangement both for British finances and British development. One would also expect that the information exchanged would be on a two-way—and not only a one-way—street, for even if they are having design trouble at the moment, there is plenty of research knowledge in the Westinghouse factory. Unfortunately for some of the more boastful of the manufacturers public relations officers, however, the announcement came just at a time when there was a good deal of talk of how American turbine development was ahead of the British.

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THE most remarkable and heart-warming American reactions over the Coronation are now receding to a pleasant glow of memory, and although this may be a subject which is a bit outside aviation comment *per se*, there were some aviation incidents connected with the arrival of the films, which may be an excuse for the writer to go on record as saying that he, and most other Britishers in the States, were profoundly moved by the sincerity of the reaction here. The introduction of commercials into the showing of the films on television was, by British standards, unnecessary—but the various incidents reported (with perhaps one exception) have been considerably exaggerated. Whether the advertising interludes were well or badly timed is another matter—but their impact was lost in the remarkable technical and emotional achievement of watching events which had only occurred some few hours before in a country 3,000 miles away. As for the aviation aspect, it seemed a great shame that the films could not have been brought direct into Boston or New York by a British jet aircraft. As it was, the flights to Gander got scant attention—rather less, in fact, than the somewhat abortive race between two P-51s from Newfoundland to Boston, and which were hired to pick up films from the Canberras. In actual fact, one of the networks, which had refused to be panicked into an aircraft race, relied on the C.B.C. in Montreal and got the film on the air ahead of the others. But B.O.A.C. did their stuff with a Stratocruiser, delivering both commentator and films to Boston so that they were shown by about 8.40 p.m. Eastern Daylight Time. As a footnote it should be recorded that more than one Englishman here was rung up by American friends and acquaintances, who wished to express their appreciation and congratulations on the Coronation, and it was this sincerity of feeling that, coming at that moment, helped to heal a somewhat ugly breach that had been widening rapidly in the wall of Anglo-American relations.

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THE current (June 29th) issue of *Time* carries an article on "Dutch" Kindelberger, the chairman of the Board of North American Aviation. This is much what one has come to expect of this particular magazine. Slick reporting combined with a high percentage of adjectives—all designed to re-write history. It describes Sabre pilots as "working 90-odd controls with the light-fingered touch of master watchmakers." It also describes "Dutch" Kindelberger as a modern-day Friar Tuck—probably the best bit of descriptive writing in the whole piece—but it doesn't name his contemporary Robin Hood. It also states that the Sabre jets in Korea have downed 719 Migs for loss of only 56 F-86s—a claim that one hopes is (but doubts as being) more accurate than our own original Battle of Britain figures. It quotes Kindelberger as saying, when asked at Farnborough last year, how he liked it, "It's okay, but we're putting on a better air show every day—in Korea," which probably comes under the heading of "remarks that were never made."

There is also some mention of the P-51 Mustang and of its origins—a piece of history that must read strangely to those British officials who were closely connected with the birth of this aircraft. Says *Time*, "Early in 1940, when the British asked North American to build Curtiss P-40s Kindelberger answered that he could design and produce a better aeroplane quicker. In 127 days he turned out the P-51, the first of the famed Mustangs. The U.S. was cool towards it, would place no orders . . . Thus, thanks to British orders, did the U.S. have the Mustang ready when it entered World War II." There is no mention of the fact that this aircraft was, one believes, designed to a British specification and it's a shame that someone doesn't write the true story of the excellent Anglo-American co-operation that went into its design, construction and flight-testing. As Dutch Kindelberger himself is reported as saying: "Nobody ever pulled a rabbit out of a hat without carefully placing one there in the first place." This certainly applies to the speaker himself, for not only is he a man who knows very well where to place a rabbit, but what sort of a rabbit it should be (with the possible exception of the N.A.A. "Navion" —which proved a horribly expensive animal). But it is his vision that has kept North American Aviation in the forefront of the aircraft manufacturers here, and their recent examination of the civil turbine transport market, and an independent study of the field of atomic power for civilian uses, shows that Mr. Kindelberger is not going to rely entirely on military aviation orders in the future. In these days of budget cuts one never knows, and a buffer to take up the slack if orders were cut, would be valuable.

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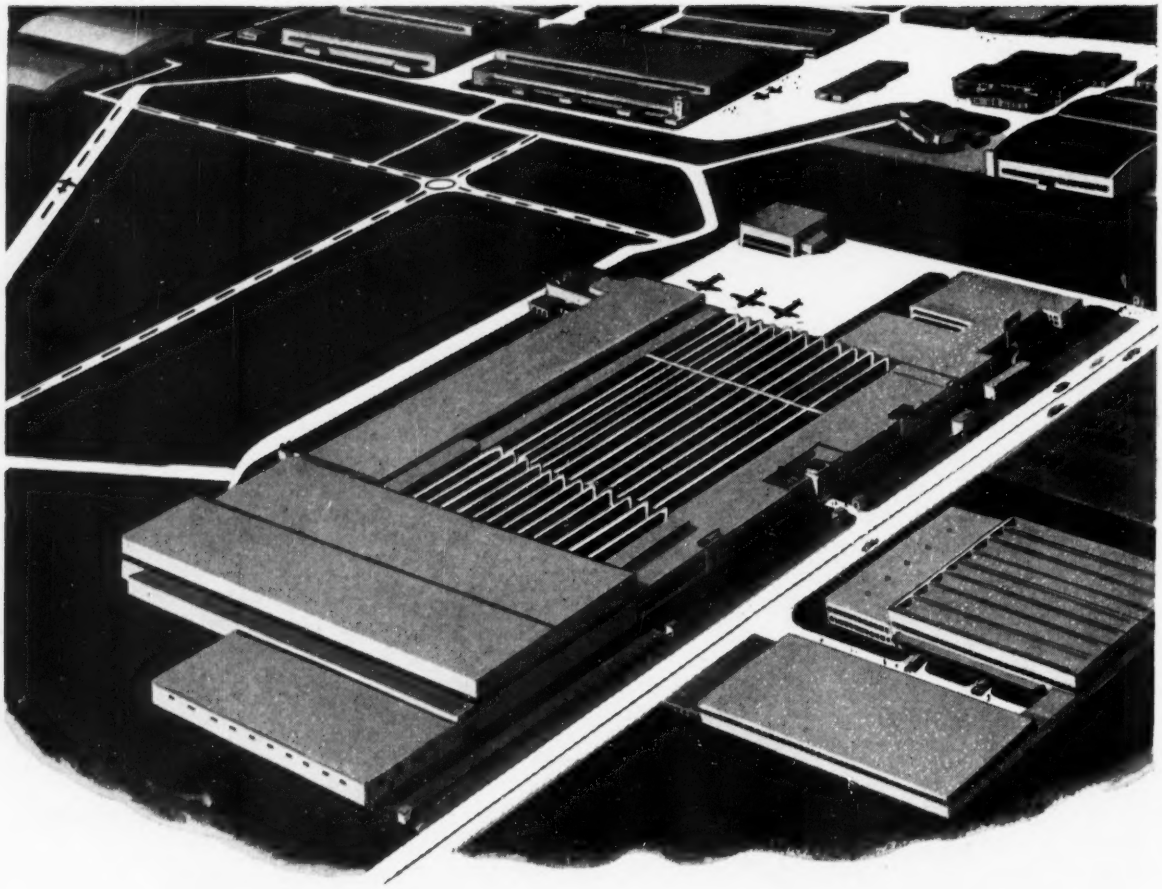

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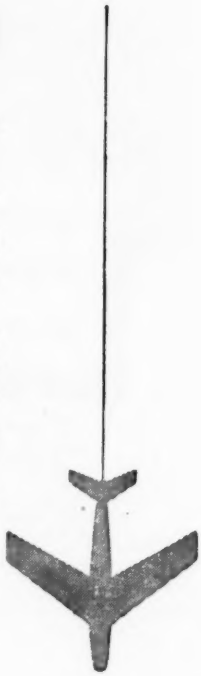


CORRESPONDENCE

The Editor of "Flight" does not hold himself responsible for the views expressed by correspondents in these columns; the names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

Supersonic Bangs: Gunnery Analogies

IN articles discussing the causes for "sonic bangs" there seems to be a leaning towards the idea that these unseemly noises connected with high-speed flight are only produced when the aircraft concerned is flying at or very close to the speed of sound.

This does not appear to be the case; bodies travelling through the air well in excess of the speed of sound give rise to noises which, if not "sonic bangs," are certainly very like them. If, for instance, an aircraft fires 20 mm cannon shells over one's head two distinct noises can be heard, firstly a very loud crackle followed by the lesser noise of the guns firing; the muzzle velocity in this case is well in excess of Mach 2, and under these circumstances it is unlikely that their speed drops to anything approaching Mach 1 before they pass over the listener. Similarly, a 4.5in shell announces its passage by a very loud bang followed by a whiffling noise culminating in the comparatively muffled "crump" of the actual gun firing—again the projectile is apparently producing a loud explosive noise whilst probably travelling at a speed well in excess of Mach 1.

Whilst the bang heard from aircraft of today is possibly caused by accumulation of noise during the periods that the machine is flying at or very close to the speed of sound, it seems highly probable that any body travelling through air at a speed in excess of Mach 1 (or perhaps less) produces a continuous loud "bang," possibly the aural interpretation of well developed double shock waves, and that aircraft flying at supersonic speeds will trail this noise around with them all the time, much to the detriment of anyone who happens to be underneath with a hangover.

c/o G.P.O., London. "SUPERSONIC BANG."

Early Guidance

(*From Professor A. M. Low*)

WITH reference to my article on early guided "missiles" (*Flight*, October 3rd, 1952), I think you will be interested to read this most generous letter I have received from Mr. Carlos B. Mirick in America. It was accompanied by an extract from the United States Naval Institute Proceedings. From this it is quite clear that our own missile was about five years before the American experiment.

"Dear Professor Low,

"When your recent article in *Flight* came to my attention I found it of more than usual interest. The reason for this you will see from the enclosed story of 'A Wild Goose Chase' which was published a few years ago in the Proceedings of The U.S. Naval Institute. Evidently we have journeyed along similar paths.

"There seems also to have been a similarity in the rewards for our work; '—some original documents. —photographs and old secret patents long released.' As in your case, there was complete reluctance on the part of our officials to make any awards for the work.

"While at the time my article was written I had no knowledge to the contrary, I am glad to be able to point out that it makes no claim to priority. This excludes it from those claims from all over the world for the invention of the guided missile.

"As a matter of fact we honestly believed that probably we were first in the field, but realized that where everything was top secret there might be other work of which we knew nothing. Also I had a personal feeling, based on long experience, that when the shouting is over and the dust has settled it can happen that some Englishman has been a couple of jumps ahead. In a way this is gratifying for if the honour of prior invention does not belong in my country there is no place I would rather have it go than to yours.

"It is certainly remarkable that your experiments met with any success whatever when the crude state of available means is considered. We thought we had troubles enough even with the use of tubes. If there are any reprints of your article or any papers giving further details which are now available, I should appreciate very much having copies of them. Meanwhile I offer my congratulations and best wishes.

"Sincerely yours,

"Carlos B. Mirick."

[The views expressed in the above letter are, of course, personal to Mr. Mirick, and may or may not coincide with those of the U.S. Navy Department. According to the U.S. Naval Institute proceedings, Mr. Mirick, an electrical engineer, joined the Aircraft Radio Section of the U.S. Naval Research Laboratory in 1922, working on the application of radio control to an aircraft already equipped for automatic flight. Using improvised equipment, work progressed under his direction towards the simultaneous and independent operation of control circuits, and flight tests were commenced, carrying a safety pilot, in 1923. Shortly afterwards, Mr. Mirick was present when the only pilotless radio-controlled flight (before the project was discontinued) was accomplished, from Dahlgren, Virginia. He is now retired.—Ed.]

Helicopter Models

NATURALLY I have been most interested in the correspondence arising from the publication (*Flight*, February 6th, 1953) of a photograph of my model helicopter.

I actually started experimenting in January 1951 with the contra-rotating reaction method of driving model helicopters. My first success was in May of the same year and details of this model were published in the November 1951 issue of *Model Aircraft*.

I had rather hoped my idea was original, but I have since learned that a successful model, using the same method of drive and powered by an I.C. engine, was flown in America in 1946, and that full-scale experiments were also carried out. Mr. K. J. A. Brookes' letter (*Flight*, May 22nd, 1953) only goes to prove that would-be inventors of to-day must be up very early indeed to catch the worms.

Andover. A. HODGSON.

In the B.A.T. Crow

PLEASE would you refer to your May 8th issue, page 586, on which appears a picture of the BAT FK. 28. Also, to your May 22nd issue and the letter on page 646, from A. H. Curtis, in which he mentions my name.

Mr. Curtis is correct. I was sitting in the Crow when that picture was taken. I did not fly it. It was the only one, and was being tested by Major Christopher Draper. I was at Hendon aerodrome to see another Koolhoven aircraft. I think it was the first commercial aircraft to be designed as such. It has four seats in a cabin in front of the pilot who sat high up behind the trailing edge.

Draper took myself and a friend for a flight in one of these aircraft, which my friend was considering buying for his own use. Nothing came of the venture and I joined Handley Page Air Transport as a pilot.

I believe the Crow was a little difficult to fly, as it suffered from giving the pilot an entirely wrong impression of speed when taking off, so one was liable to pull it off before flying speed was gained. As on the approach it appeared to be very fast, and unless care was taken it was easy to stall the aircraft a few feet up. I have experienced the same sensations in other low-slung aircraft.

Bombay. R. VAUGHAN FOWLER.

FORTHCOMING EVENTS

July	11.	"At Home," R.N. Air Station Anthorn.
July	11.	Auster Flying Club: Display.
July	11.	Cardiff Aeroplane Club: Display, Pengam Moors Airfield.
July	12.	Northern Heights Model Flying Club: Gala Day.
July	12.	International Parachute and Gliding Meeting, Brussels.
July	15.	Royal Air Force Coronation Review.
July	18.	Vintage Aeroplane Club: Rally, White Waltham.
July	18.	"At Home," R.N. Air Station Brawdy.
July	18.	Royal Netherlands Air Force and Royal Netherlands Aero Club: N.A.T.O. Display, Soesterberg.
July	18-19.	Aero-Club d'Italia: Dolomites Tour.
July	19.	Aéro-Club de la Vendée: Sables d'Olonne Rally.
July	22.	"At Homes," R.N. Air Stations St. Merryn and Arbroath.
July	25.	"At Home," R.N. Air Stations Ford and Stretton.
July	25.	R.Ae.C.: National Air Touring Competition.
July 25-Aug.	3.	B.G.A. National Gliding Championships Great Hucklow.
July	26.	R.A.F. Model Aircraft Association: United Kingdom Championships, St. Athan.
July	26.	International Radio-Controlled Models Society: Aircraft Contests, Southend-on-Sea Airport.
July 27-Aug.	1.	Aéro-Club de France: Parachuting Championships Blois-Le-Breuil.
Aug.	1.	Opening of Jan Smuts Airport, Johannesburg.
Aug.	1-3.	S.M.A.E.: World Model Championships, Cranfield.
Aug.	8-13.	Round-Switzerland Air Tour.
Aug.	22.	Coventry Air Day and Siddeley Challenge Trophy Race.
Aug.	23.	St. Albans Model Aero Club: All-Britain Model Aircraft Rally, Radlett.
Aug.	30.	Aero-Club d'Italia: Pescara Rally.
Sept.	3-10.	Aéro-Club de Cannes: Cannes Grand Prix.
Sept.	6.	S.M.A.E.: "Yorkshire Evening News" Model Flying Festival, Sherburn-in-Elmet.
Sept.	7-13.	S.B.A.C.: Farnborough Display and Exhibition.
Sept.	12.	"At Home," R.N. Air Station Eglinton.
Sept.	14.	R.Ae.S. Wilbur Wright Memorial Lecture: "Structures," by Prof. N. J. Hoff, F.R.Ae.S., F.I.Ae.S.
Sept.	14-17.	R.Ae.S. and I.Ae.S.: Anglo-American Aeronautical Conference.
Sept.	15.	Battle of Britain Day.
Sept.	19.	"At Home," R.N. Air Station Abbotsinch.
Sept.	19.	R.A.F. At-Home Day.
Sept.	20.	Aero Club de Milan: Milan Grand Prix.
Oct.	8.	Start of England-Christchurch (N.Z.) Air Race.
Dec.	17.	Anniversary of the Wright Brothers' First Flight.

THE INDUSTRY

A New Turbo-starter

A NEW starting system for turbojet engines was demonstrated recently by Rotax, Ltd., of Willesden, to representatives of the M.o.S., Armstrong Siddeley and Rolls-Royce, on a Sapphire engine at the Armstrong Siddeley test house.

It is a requirement for a present-day fighter aircraft that its starter should accelerate the engine to idling speed in about 10 seconds. Such a starting system must be self-contained on the aircraft and independent of ground supplies, and must take minimum power from the aircraft battery. To achieve this aim, various methods have been developed. The cordite turbo-starter is already in production for several types of engine, and liquid mono-propellents—notably iso-propyl nitrate—are being tried out.

The new starter—developed by the Bendix Aviation Corporation in the U.S.A., and to be made in this country by Rotax—is also of the turbo type, but it employs a petrol-air mixture as its propellent, enabling the fuel normally used for the main turbine to be employed. The starting system includes—in addition to the starter itself, with self-contained combustion chamber, igniter and control box—an air bottle and an air compressor. The compressor charges the bottle to 3,000 p.s.i. (the high pressure reducing storage space and weight) and the pressure is reduced to 45 p.s.i. before being mixed with the fuel. The mixture burns at 150 p.s.i., the ratio being stoichiometric.

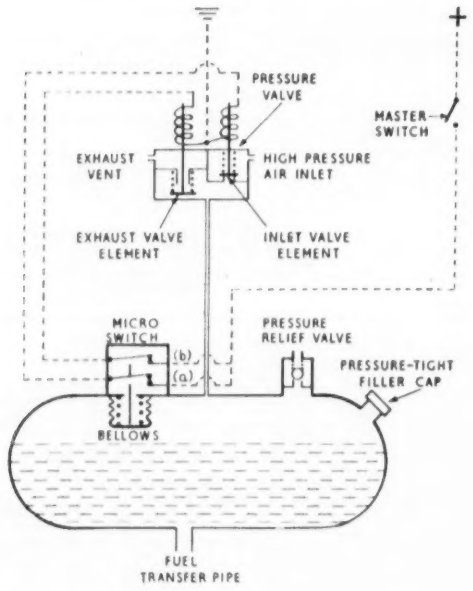
Fuel Tank Pressurization

A SIMPLE lightweight fuel pressure-transfer system has been produced by the Dunlop aviation division by which the tanks need be pressurized only while fuel transfer is taking place. The system permits the tank to be coupled to a high-pressure air supply (up to 3,000 p.s.i. max.), and provides for this pressure to be reduced to 3-4 p.s.i., or to any desired operating pressure, through the medium of a single pneumatic valve and a pressure-operated switch. The pressure valve is provided with solenoid-operated inlet and exhaust valves, so arranged that when the current is off the inlet valve is closed and the exhaust is open. This pressure valve is coupled by direct pipe-line to the fuel tank.

Mounted on the upper face of the tank is the pressure-operated switch containing two sets of quick make-and-break contacts. A sealed, spring-loaded bellows assembly—sensitive to tank pressure—is mounted on the inner wall of the tank. The base plate of the bellows carries a plunger which protrudes through the tank wall to oppose the arm of the contacts (see diagram).

When fuel transfer is required the pilot operates the master switch, thereby energizing the pressure valve solenoids. The exhaust valve closes and the inlet valve opens, allowing air pressure to pass to the tank. Increasing pressure in the tank collapses the bellows until at the required tank pressure the plunger touches the arm of the contacts "a" to break the circuit to the inlet-valve solenoid, and the valve closes under the action of its return spring. During the transfer of fuel resulting from the pressurization of the tank, the bellows will expand slightly as the pressure tends to drop. This expansion will withdraw the operating plunger, and contacts "a" will close to re-energize the inlet valve solenoid, thus opening the valve to admit more air. The bellows will then contract to break the circuit again, and will continue to breathe in this manner throughout the transfer process, thereby maintaining tank pressure up to transfer requirements.

If, due to temperature rise or any other cause, there is a rise of pressure in the tank above that required for fuel transfer, a further compression of the bellows will take place. This will result in a greater movement in the arm of the switch contacts "a". The small plunger attached to this arm will touch the arm of the contacts "b" to break the contact and de-energize the exhaust valve solenoid, thus opening the exhaust valve to permit the excess pressure to escape. As a safety precaution a ball-type relief valve, set to blow-off at a pressure slightly in excess of the system relief pressure, is fitted into the tank wall.



The Dunlop lightweight fuel pressure-transfer system, in diagrammatic form (see description above).

IN BRIEF

Sir William Stanier, F.R.S., has accepted an invitation to join the Board of Brynmawr Rubber, Ltd., Brynmawr, South Wales.

* * *

Plain Facts about the Care of V-Belts is the title of a practical brochure lately published by the British Tyre and Rubber Co. Ltd., Herga House, Vincent Square, London, S.W.1.

* * *

The Electrical Appliances Group of Philips Electrical, Ltd., announce that the new "Philishave" dry shaver has been chosen by B.O.A.C. for installation in the men's toilet compartments of their Comets.

* * *

Described and illustrated in a leaflet from Robert Kelly and Sons, Ltd., 55, Market Street, Manchester, 1, is the D.F.S. hand-operated, bench-mounted shrinking and stretching machine for use on a wide variety of metal components by semi-skilled labour.

* * *

Saw-toothed clamps for attaching hoist-slings to mild-steel plates are the latest product developed by Chamberlain Industries, Ltd., Leyton, London, E.10. The clamps increase their grip with increased weight, but release themselves automatically when the load is relieved.

* * *

Recent publications by the British Standards Institution (24-28 Victoria Street, London S.W.1) include B.S. SP49 and 50/53, *Ball Ends for Swaging-on Cable for Aircraft* and B.S. SP51 and 52/53, *Identification Tags for Swaged Cable-end Assemblies.* The price of each pair of publications is 1s.

* * *

Listed in a folder from British Insulated Callender's Cables, Ltd. (21 Bloomsbury Street, London W.C.1) is a comprehensive range of standard connecting wires insulated with polyvinyl chloride (P.V.C.) compound, polythene, silicone rubber or polytetrafluoro-ethylene (P.T.F.E.) and conforming to M.o.S. (Air) Spec. EL.1701.

* * *

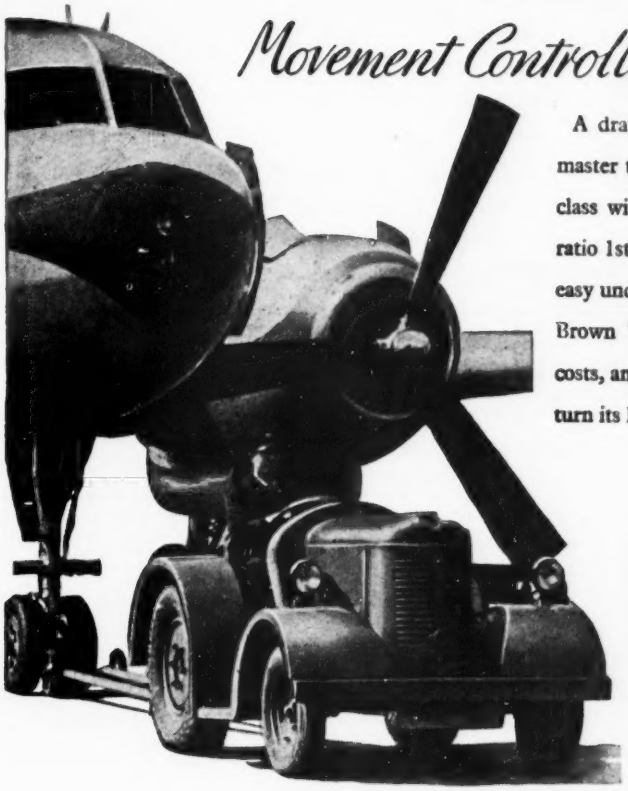
A booklet on the uses of Geon P.V.C. plastics includes references to Duranide plastic leathercloth—made from Geon P.V.C. by the Greenwich Leathercloth Co., Ltd., (21, St. James's Square, London, S.W.1)—as specified by B.O.A.C. for the interior furnishing of Comet, Argonaut and Hermes aircraft.

* * *

From W. W. Haffenden, Ltd., Richborough Rubber Works, Sandwich, Kent, come examples of industrial and/or domestic lighting and power fittings—"Duraplug" plugs, sockets, cable couplers, etc.—made in moulded rubber. Weatherproofness and sound electrical and mechanical design characterize these accessories.

* * *

As already briefly recorded in these columns, certain of the sales activities of R. A. Brand and Co., Ltd., of Manchester, have now been centralized in new London offices at 72/75 Red Lion Street, Holborn, W.C.1 (Chancery 2605). Here are located the spray-packaging ("Cocoon") division and the export and London area sales sections of the conversion division; between them these departments cover almost every aspect of modern "flexible" packaging.



Movement Controlled–by the TASKMASTER

A drawbar pull of 3800 lb. enables the David Brown Taskmaster to handle aircraft up to the Convair, Viking, and Dakota class with ease and safety. The 4-speed gearbox with its low-ratio 1st gear equips the driver for full-power 'break-out' with easy under-way gear-shift to suitable working speed. The David Brown Taskmaster speeds up ground movement, lowers fuel costs, and although primarily designed for aircraft handling it can turn its hand to every conceivable haulage job around the airfield.

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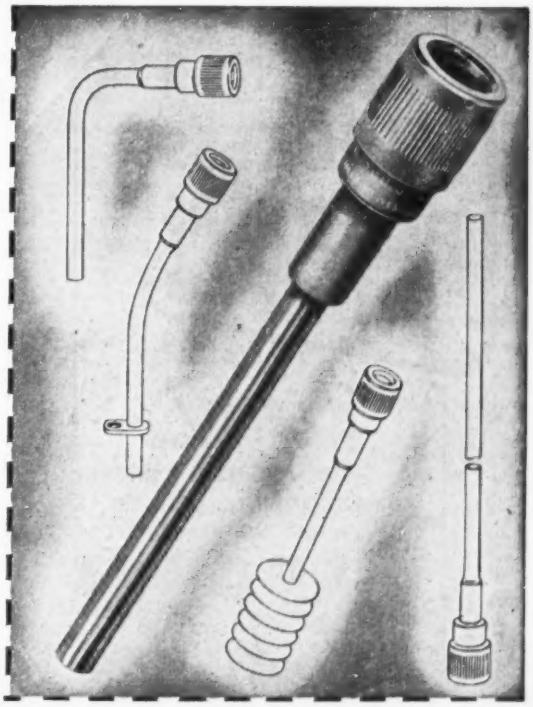
Weston Resistance Bulbs

The Model S.110 Platinum Resistance Bulb, used in conjunction with a Weston circular scale indicator is greatly superior in every respect to other methods of temperature measurement. Its platinum element is the most stable, accurate and the smallest yet produced for practical applications. Due to the very small size of the resistance element, the response time is extremely rapid. Reliability and long life are ensured by the fact that the element is hermetically sealed into a ¼" o/dia. stainless steel sheath which is fitted with a watertight plug connection. The socket is moulded integrally with special cable which is supplied. The Model S.110 is suitable for temperatures between −200°C. and +500°C.
Full details of Weston equipment for aircraft will gladly be supplied on request.



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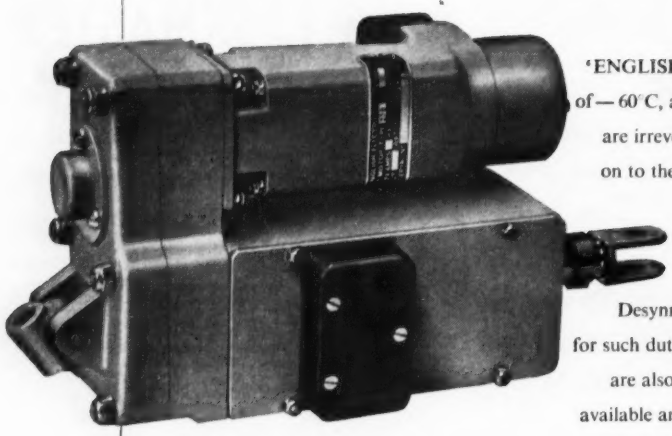

Linear Actuators

'ENGLISH ELECTRIC' actuators will operate at temperatures of —60°C, also in tropical and high altitude conditions. All types are irreversible and their robust design enables them to be run on to their stops without damage. They meet the requirements of all prevailing specifications. Illustrated is the type 258 linear actuator designed for 400-lbs. normal load, 2.75" stroke. Incorporated are limit switches and a Desynn type position indicator transmitter. Larger actuators for such duties as tailplane incidence control and rotary actuators are also available. Publications describing these actuators are available and will be sent on request.

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NEW BRISTOL APPRENTICE SCHOOL

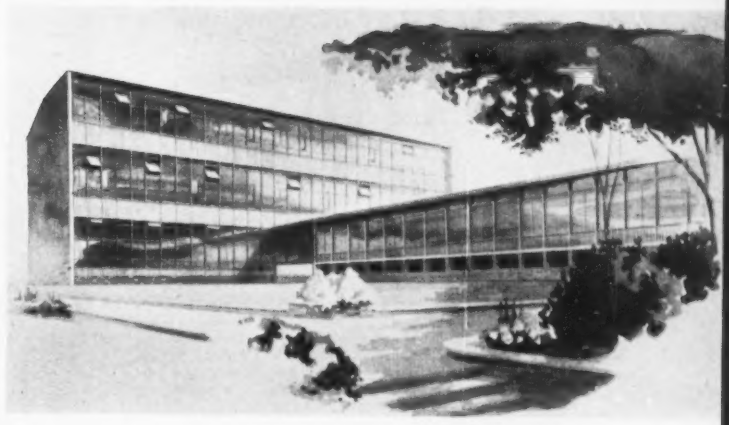
AT Filton on June 27th, the foundation stone of the new technical school for apprentices of the Bristol Aeroplane Company was laid by Sir Walter Monckton, Minister of Labour and National Service. The new school is intended to provide technical education for all trade and engineering apprentices of the company, who number over 900 at present. The first constructional phase of the school is of a long, single-storey block forming a T-junction at one end with a three-storey building, the whole housing classrooms, laboratories, a drawing office, and administrative offices. The design of the school, which occupies a site between the engine division and the aircraft and car divisions of the company, is a blend of traditional methods and aluminium unit construction. It is hoped to add at a later date a large machine-shop and an assembly hall, kitchens and canteen.

After the laying of the foundation stone, the Minister was the guest of honour at the annual apprentices' prize-giving, with the joint managing director, Sir Reginald Verdon Smith, as the chairman. More than a thousand people, including representatives of the Ministries of Education, Labour, and Supply, the Board of Trade, the House of Commons, trade unions and educational and industrial organizations, were present to hear Sir Walter address the apprentices and to see him present the prizes.

The Minister said that it was importan. to feed greater and higher skill into industry if this country was to meet the pattern of trade requirements, and in this respect the Bristol Aeroplane Company was encouraging and supporting young men. He hoped that the company would always keep a close connection with Bristol University and its Faculty of Engineering, and he urged parents to take an interest in their sons' work.

Sir Reginald described the new apprentice school as being a milestone in the company's educational work. It was not the first of their school arrangements or facilities, but it was something much bigger than had been provided before. Surveying the apprentices' work over the past year, the company's chief training and education officer, Mr. R. A. O. McMillan, said that Bristo apprentices had obtained 15 University degrees, and 162 had reached the qualifying standard on their various courses and had passed out to begin professional careers. The present total of 928 apprentices was the highest ever.

A vote of thanks to Sir Walter Monckton was proposed by engineering apprentice B. R. Cutler, after which the apprentices, their parents and guests were entertained to lunch. In the afternoon, the company held its annual athletic meeting on the sports field.



FOR BRISTOL APPRENTICES; An artist's impression of the first section of the new Bristol apprentices' training school. It has been designed for the company by their chief architect, Mr. Eric Ross, and includes a large amount of aluminium unit construction.

FROM THE CLUBS

CLASS races for Tiger Moth and for Hawk Trainer aircraft respectively form part of the programme for the Vintage Aeroplane Club's rally at White Waltham on July 18th. Late entries may be accepted, but immediate application to the secretary, David Ogilvy, is advisable. The course for both these races will be two laps of a nine-mile circuit, in view of the spectators throughout each event. An admission charge of 2s. 6d. is being made for the public, and proceeds will go to the Alcock and Brown Memorial Fund.

* * *

FLYING enthusiasts in two widely separated parts of Britain are catered for tomorrow (Saturday) at the annual air displays of the Cardiff Aeroplane Club at Cardiff and the Auster Flying Club at Rearsby. Varied programmes are planned for both events.

* * *

TEA patrols at two clubs—Elstree and Fair Oaks—took place last weekend, in what seemed to be good weather for the attackers. At Fair Oaks, six aircraft beat the defence and won free teas for the occupants, while Mr. Armstrong of Redhill, Mr. Lowe of White Waltham, and Mr. Wannop of Portsmouth, received the first-arrival prize of five gallons of petrol, the sealed-time arrival prize of five gallons of oil, and the best-landing prize (a bottle of gin) respectively. At Elstree, no attacking aircraft succeeded in getting through unobserved, but Mr. Jackson from Southend won the spot-landing contest in his Tiger Moth. Elstree's hours for June, logged on their three Austers and two Hawk Trainers, amounted to 206.

* * *

APPRENTICES of Short Brothers and Harland, Belfast, are now eligible to receive flying instruction at the Ulster Flying Club, Newtownards, at reduced rates. Under an agreement between the club and the company, those selected pay 15s per hour (or 30s per hour if over the age of 21) and take the club's full P.P.L. course.

SICILY'S fifth annual air race was won recently by Gian Ferrari, runner-up to W/C. McIntosh in last year's *Daily Express* South Coast race in this country. As in the British race, he was flying the Ambrosini S-7.

R.Ae.C. PILOT'S CERTIFICATES AWARDED, MAY-JUNE 1953

No.	Name	Cl	Date	No.	Name	Cl	Date
28,350	Miss C. Bargery	4	9.5	28,368	M. V. Twigg	4	5.6
28,351	E. A. Thompson	2	9.5	28,369	G. Clifford	3	5.6
28,352	J. S. Hardiman	2	9.5	28,370	J. B. Stonier	3	8.6
28,353	A. W. Wilkinson	2	9.5	28,371	D. F. Olgivy	1	9.6
28,354	A. W. Shead	2	11.5	28,372	R. W. Cook	4	9.6
28,355	P. N. Everton	4	12.5	28,373	M. J. Fletcher	4	9.6
28,356	L. W. Hudson	3	12.5	28,374	R. A. C. Harris	4	9.6
28,357	D. Kay	1	12.5	28,375	R. B. Palmer	4	9.6
28,358	J. P. D. Heyward	4	13.5	28,376	R. W. Kenny	1	11.6
28,359	D. O. Lewis	3	18.5	28,377	J. A. Bennett	1	11.6
28,360	W. J. Unwin	1	18.5	28,378	J. B. Penrose	4	16.6
28,361	S. J. Cooper	4	19.5	28,379	D. L. Lancaster	1	22.6
28,362	I. A. M. Hall	4	19.5	28,380	C. W. Richardson	1	22.6
28,363	G. C. Snyders	2	19.5	28,381	G. W. Paul	3	23.6
28,364	J. S. Vine	1	21.5	28,382	C. Mansfield	1	23.6
26,365	T. A. J. Stocker	4	29.5	28,383	D. R. Turley-George	1	24.6
28,366	C. A. Blaber	4	5.6				
28,367	B. A. Strand	4	5.6	28,384	Miss R. Kerby	4	24.6

OPENING THE GATE: Arriving at Ramsgate Airport by B.E.A. helicopter for the official opening ceremony (reported in last week's issue) is Mr. A. T. Lennox Boyd, Minister of Civil Aviation. He was accompanied by Chief Kidaha Makwaia, of the Sukuma tribe, Tanganyika, and was received at the airport by Councillor E. G. Butcher, Mayor of Ramsgate. Present operators at Ramsgate are Air Kruise, Ltd., and the Ramsgate Flying Club.

CIVIL AVIATION

DEPARTURE: The scene at London Airport on June 30th as the Queen Mother and Princess Margaret took leave of the Queen. As related below, the Royal Comet covered the 6,071 miles to Southern Rhodesia exactly to schedule in less than 21 hr.

ROYAL FLIGHT TO RHODESIA

COMET G-ALYW, the B.O.A.C. aircraft which flew Queen Elizabeth the Queen Mother and Princess Margaret to Salisbury, Southern Rhodesia, left London Airport and arrived at its destination exactly on schedule. Under the command of Capt. A. P. W. Cane, it took off from London at 1.15 p.m. (G.M.T.) on Tuesday, June 30th, arriving at Kentucky Airport, Salisbury, 6,071 miles away, 20 hr 45 min later. This record of the historic journey has been provided by B.O.A.C.:—

"Crossing the English Coast near Brighton and the French Coast near Dieppe, it passed the western suburbs of Paris at 35,500ft . . . the Comet touched down at Rome, the first stop, 2 hr 28 min after its departure from London Airport. After an hour's stay at Rome the Royal party was again airborne, soon crossing the Italian coast at the toe of Italy and flying over the Ionian sea towards Greece. One hour 23 minutes after leaving Rome the Comet, in clear weather, was flying over Athens and shortly afterwards passed over Rhodes Island at 35,500ft.

"The aircraft touched down at Beirut at 1955 hr (G.M.T.) and just over an hour later was on its way. Thirty-five minutes after leaving Beirut the Comet was 67 miles north-east of Port Said, at a cruising altitude of 33,000ft, and after passing over the Port turned direct south to fly over the Arabian desert, the Royal party retiring for the night.

"The aircraft crossed and re-crossed the bends in the River Nile near Luxor, and again met the river further south at Wadi Halfa. Still in clear weather, the Comet started its descent for Khartoum, touching down there 11 hr 20 min after it left London. Here a new crew, under the command of Capt. E. E. Rodley, took over.

"After an hour and a half's halt at Khartoum the Comet was off again, and 1 hr 47 min later was flying over Juba, on the White Nile, near the border of Sudan and Uganda. The next and final stop before the Comet's destination was Entebbe on the northern shore of Lake Victoria. There, almost on the equator, the Royal party disembarked to have breakfast at Government House. Just under two hours afterwards the aircraft was again airborne, flying south across Lake Victoria and passing the southern tip of Lake Tanganyika and the Zambesi River.

"The Comet touched down at Salisbury, as planned, at 0952 hr (G.M.T.) on Wednesday and at 1000 hr (G.M.T.), exactly on schedule, the doors of the aircraft were opened for the Queen Mother and Princess Margaret to alight."

ELIZABETHAN AND VISCOUNT ECONOMICS

INTRODUCED to regular service on April 19th, B.E.A. Viscounts have now flown over 1,000 hr on the routes to Cyprus, Istanbul, Geneva, Zurich and Stockholm. In the latest *B.E.A. Magazine*, the Corporation's chief executive, Mr. Peter Masefield, quotes some figures illustrating the excellent performance given by these brand-new aircraft :—

"During the first 1,000 hr of scheduled commercial operation, the B.E.A. Viscounts have operated for an average sector distance of 625 statute miles, achieving a block speed (doors shut to doors open) of 221 m.p.h., including all aerodrome taxying and delays.

"In the first 1,000 hr of operation Viscounts have flown 221,000 revenue miles, carried 7,700 passengers and 77 tons of mail and freight and have earned £240,000 of revenue. They have achieved a regularity of operation of 99.3 per cent. Utilisation is at the rate of 1,550 hr so far—building up.

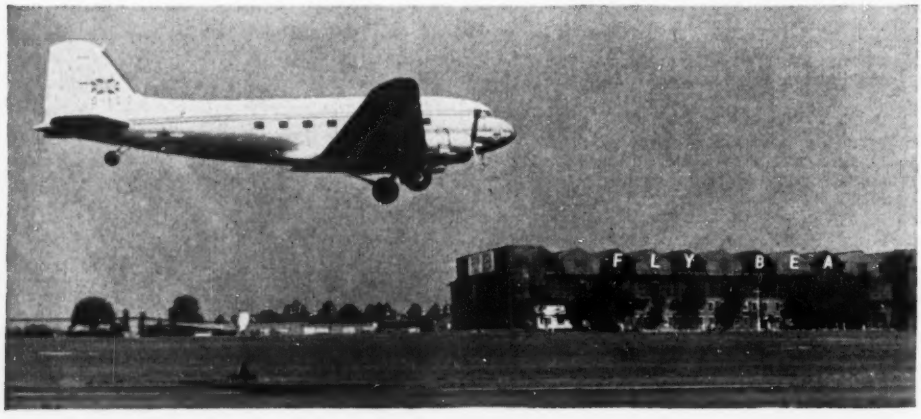
"On the cost side, the break-even factor load on the 625-mile average stage has worked out at 62 per cent on total costs, including interest on capital and the full weight of airline overheads. The achieved load factor has been 76 per cent.

"Thus, during their first 1,000 hr of operation B.E.A.'s turbo-prop Viscounts have made an overall profit for the Corporation of £45,000 in carrying an average load on each flight of 32 passengers and 800 lb of mail and freight. Not bad as a start.

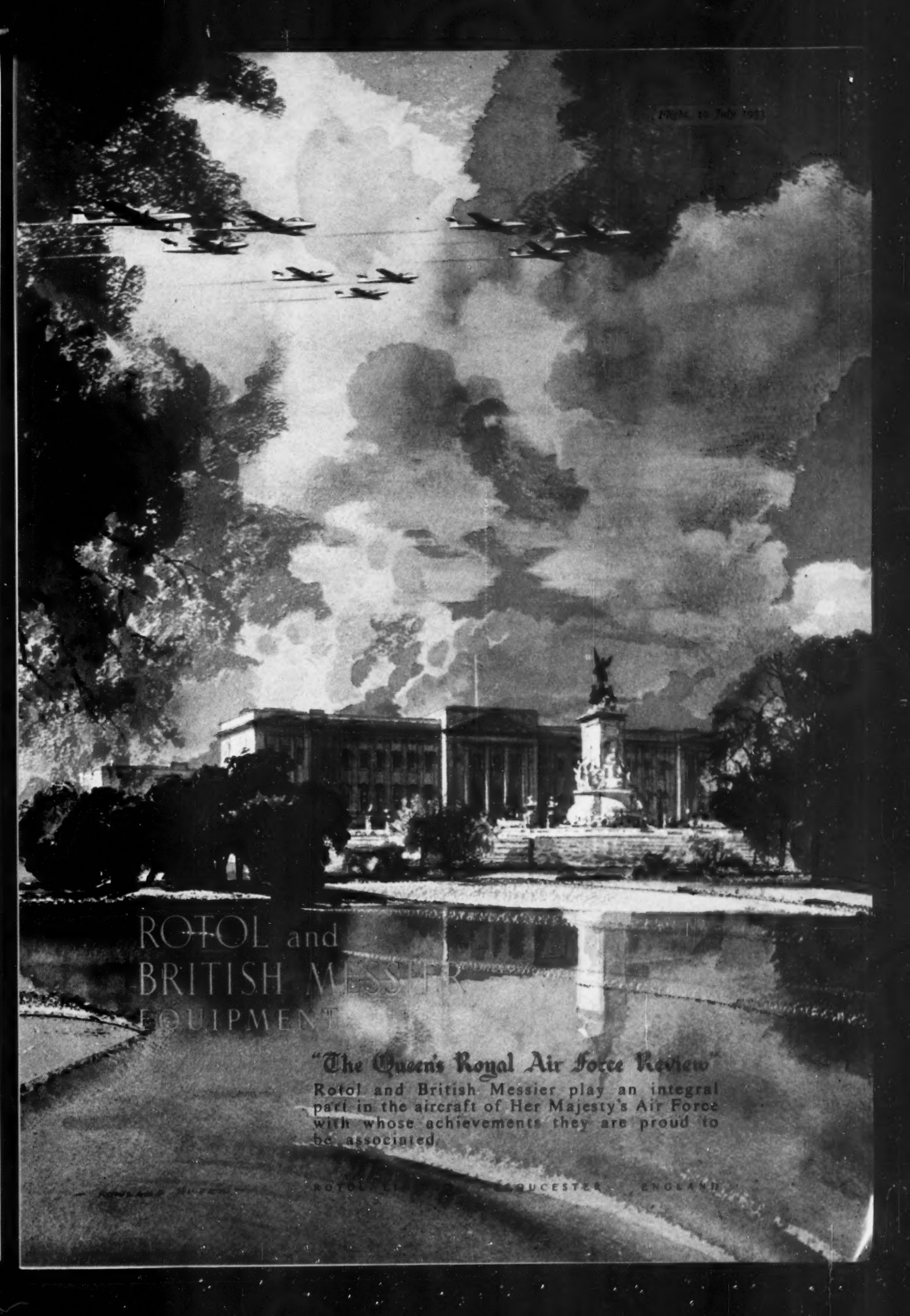
"In this 1,000 hr of flying the Rolls-Royce Dart propeller-turbine engines have made some 3,200 million revolutions ('3.2 billion' in American parlance)—and have been remarkably free of troubles. As an interesting sidelight they have consumed some 260,000 Imperial gallons of kerosine weighing 950 tons, while the passengers inside have consumed some 13,500 hot meals."

Mr. Masefield also has a bouquet for the Elizabethan, which in the early stages proved more subject to minor mechanical troubles than have the Viscounts to date :—

"In the past 12 months—ended May 31st—the Elizabethans have flown a total of 14,000 revenue hours and some two and a half million aircraft miles. They have carried 155,000 passengers for 63 million passenger miles. In addition they have lifted some 1,800 tons of mail and freight. The break-even load factor of the Elizabethan on total costs is today about 67 per cent, including interest on capital cost and a full share of overheads. In the past



PIONAIR has now become well known as B.E.A.'s class-name for their modernized Dakotas. This example, seen taking off from Northolt, has also the subtitle Leopard, being readily convertible from freighter to airliner.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Photographed by courtesy of B.O.A.C.

Flight, 10 July 1953

CHRISTCHURCH AIRPORT, terminal of the New Zealand race next October, is the subject of this new air view. The airport, which has splendid natural approaches, is now undergoing extensive improvements to runways, taxiways and facilities. The longest runway is 6,600ft in length.

CIVIL AVIATION . . .

year a load factor of 64 per cent has been achieved. In all, Elizabethans have earned more than £2 million of revenue in the past 12 months. That is good going—remembering that the Elizabethans have been operating over what are—economically—some of our more difficult routes."

MANX EXPANSION

TWO Dakotas (G-AMZB and G-AMZC) have now been acquired by Manx Airlines, Ltd., to supplement their fleet of four Rapides. Both have been refurnished and fitted with 32 Rumbold seats, together with double freight doors and strengthened floor, making them suitable for quick conversion to cargo work. Throughout the summer they will be based at Ronaldsway, but it is the company's intention to operate them from the London area during the winter. The Dakotas will be used largely for charter work, and in this connection James Burness (Travel), Ltd., have been appointed as brokers on the Baltic Exchange.

T.O.A. LIQUIDATED

ONE of the few remaining airlines devoted solely to flying-boat operations, Trans Oceanic Airways Ltd., is in liquidation. Ansett Airways have completed negotiations for the purchase of T.O.A.'s assets and are awaiting government approval to operate the latter company's service between Sydney and Lord Howe Island. Two of the T.O.A. flying-boats—Short Solents—were recently sold to South Pacific Airways for service between Honolulu and Tahiti, and Ansett Airways will acquire the remaining aircraft, a Hythe, in addition to T.O.A.'s flying boat base at Rose Bay, Sydney.

AIRPORT ACTIVITY DURING MAY

AIR transport movements at U.K. airfields during May of this year numbered 18,410, approximately 23 per cent more than in May, 1952. The total of passengers handled was 305,200, approximately 35 per cent more than in May last year, while freight increased some 76 per cent to 5,950 tons. Post Office mail set down and picked up during the month increased slightly over last year's figure to 1,170 tons. The freight traffic increase was caused mainly by an increase of 1,700 tons in the weight of vehicles handled at Lympne Airport.

At London Airport, there were 4,260 movements and 109,600 passengers were handled (increases over May, 1952, of 60 per cent and 53 per cent respectively). Northolt Airport recorded 3,440 movements and 67,700 passengers handled. During the fortnight preceding the Coronation, passenger arrivals at London and Northolt totalled 52,300—80 per cent more than in the same period last year. During the month, most of the country's other main airports also showed considerable increases in passenger traffic compared with May of last year.

NEW DOUBLE-DECKERS, such as the one pictured here, went into service with Aer Lingus at Dublin Airport on July 1st. They carry 50 passengers each, and have a rear baggage compartment of some 400 cu ft.

BREVITIES

AMERICAN Airlines recently took delivery of the second of three DC-6As ordered, and flew it from the West to the East coast with a record load of 25,568 lb of cargo.

* * *

Six compound-engined Super Constellations have been ordered by Northwest Airlines for use on Pacific routes. Delivery will begin next year and will be completed in 1955.

* * *

In preparation for the start of international services early next year by Pakistan International Airlines, Pakistan has negotiated bi-lateral agreements with Syria, Lebanon, Iran and Iraq, and is at present discussing similar agreements with Turkey and Egypt.

* * *

Combined first- and tourist-class accommodation has been provided by S.A.S. on its weekly services to and from Teheran. The DC-6 aircraft used are equipped with 44 tourist seats in the forward cabin and 16 first-class seats in the after cabin.

* * *

Following successful tests with Dunlop's Maxaret brake control, which prevents wheels from locking even when full brake is applied throughout the landing, the equipment is now being produced on a large scale.

* * *

The first export cars ever flown to Belgium—three Austins—were carried from Lympne to Ostend in a Silver City Airways Superfreighter on June 20. Incidentally, Belgium has reduced by 50 per cent the landing fees paid by users of the country's secondary airports as a result of two years' pressure by the British independent.

* * *

Record revenue passenger-miles total in one day's operations for T.W.A. occurred on June 7th, and amounted to 9,715,129. Delivery of the last of eight T.W.A. Constellations converted to 81-seat tourist configuration (from the 57-seat layout) was made ahead of schedule last month.

* * *

During June, a Bell 47D helicopter operated by Helicopter Air Service of Chicago completed a total of 4,000 hours accident-free flight time. Since services were commenced in August, 1949, the machines of H.A.S. have flown some 1,238,000 miles, carrying over 11,000,000 lb of mail.

* * *

Plans for the construction of the new runway and terminal building at Prestwick have been approved in principle by the Scottish Aerodromes Board, and the Minister of Civil Aviation is expected to announce the scheme as soon as negotiations with local authorities are complete. The work will probably begin before the end of the year and will take two or three years to complete.

* * *

The council of the Air Registration Board announces the issue of the following notices to licensed aircraft engineers and to owners of civil aircraft: No. 4, Issue 13: *Propellers Approved for use on Civil Aircraft*. No. 6, Issue 13: *British Civil Airworthiness Requirements, General Information*. No. 7, Issue 15: *British Civil Airworthiness Requirements, Particulars of Sections and Sub-sections issued*.

THE WEEK AT THE SALON (Continued from page 39)

Lutetia.—Little known outside France, this company makes aero-engines of the light, air-cooled, two-stroke type. Two-stroke engines suffer from many handicaps, but the Lutetia models aim at getting the best of both worlds by careful design. The mixture is not pre-compressed in the crankcase, but in an eccentric-vane supercharger; with a normal carburettor this gives "excellent atomization and easy starting." Again, no oil is necessary in the fuel, a normal four-stroke-type system being included, with the crankcase acting as tank and cooler.

The most-used model is the 4.C.O2, a vee-four with air-cooled cylinder blocks and spark ignition. Giving up to 44 h.p. at 2,800 r.p.m., this engine powers the Béné Jodel, illustrated on page 19 last week.

Potez.—Although Henri Potez resumed aircraft manufacture only this year, the firm has turned out air-cooled aero engines for many years. Of the current models, it is noteworthy that, although they are variously fitted with reduction gear, direct fuel-injection, or supercharger, all utilize the same cylinder size, namely 125 by 120 mm. The same sort of standardization applies to many other parts. A number of four, six, and eight cylinder engines were exhibited, and the company certainly appear to be developing classical engines as long as they have a market. Auxiliary motor generator sets were also on view.

Rolls-Royce.—A representative RA 7 Avon has now been prepared as a show model, and this was seen to have a large-diameter hot-air anti-icing system installed, as well as a number of other new features. Listed in the French brochure as a military prototype, the engine was actually a production power-plant, and it is believed that it has actually run. Although the Avon is, or is likely to be, licence-produced in Sweden, France, Australia, Belgium and Canada, one cannot say any more about it, nor can Rolls-Royce cut one open for display.

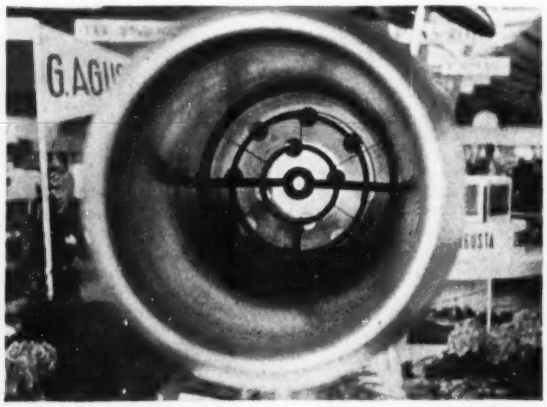
Probably complementary to the RA 7 was the Avon afterburner illustrated on page 20 of our last issue. This also was a production job, and showed itself to be a very workmanlike sheet-steel assembly. Bearing in mind the almost frightening airflow, heat dissipation and power output, this afterburner has very modest dimensions. No blanking caps were fitted, but the burners and flame-holders were removed. Left- and right-hand two-position eyelids are fitted, the actuation being effected by four Dunlop electro-hydraulic jacks, the eyelids being mechanically interconnected to prevent deviation of the thrust-line.

Although one exhibition Dart was then on show at Zurich, Rolls-Royce produced another superb example which, although not quite representative of the latest Viscount practice, had the fully shrouded turbine blading machined from solid Nimonic blanks. These very neat blades are made by Rolls-Royce, as also are the hollow nozzle guide vanes which are precision-cast by the lost-wax method. A sectioned Derwent was also shown, but held no secrets.

Salmson.—The most eye-catching engine here was a genuine Canton-Unné of 1916 vintage. Of more immediate interest was a model 9NH helicopter power-plant of the type fitted in the Alouette. This nine-cylinder radial features forced-air cooling and, with a rated power of about 216 h.p., it is remarkable that the equipped weight is under 400 lb. Also shown was an inverted vee-eight of some 255 h.p., of the type used in several trainers.

S.F.E.C.M.A.S.—Singularly neat was the S.600 ramjet made of thin steel sheet sprayed with silver paint. At the end of the diffuser section two pipe rings carry four and eight burners respectively, as shown in the photograph on this page. In the centre is an air swirl inducer. From the spray rings an inner steel wall runs back for a distance of about 2ft, separated from the original wall by a ¼in air cooling space. Photographs showed an S.600 mounted under each outer wing of a Ju88G, and we learnt that the company have applications in various missiles, but have not yet flown the engine as a primary power unit. With a diameter of 60 cm (about 2ft), the weight is 160 lb, and a typical performance is a thrust of 265 lb at 560 m.p.h. at 40,000ft for a fuel consumption of 42 lb/sec.

A lively colour film showed the flight of pilotless engine test-beds photographed from an accompanying aircraft. The majority were winged missiles launched, apparently, over North Africa at about 20,000ft. Various types of rocket or ramjet were fitted in the fuselage or wing-tips, some burning brightly and shedding what appeared to be pieces of burning solid fuel. One vehicle suddenly blew up with extreme violence—which no doubt explains why that part of the film was sub-titled *Lancement d'un Engin Explosif.*



S.N.C.A.S.O.—With the marketing licence for the Palas auxiliary turbojet, S.N.C.A.S.O. showed the latest unit on their stand. They have taken the basic Turboméca engine and worked it into an excellent auxiliary turbojet, the chief function of which is likely to be the boosting of DC-3s to meet the I.C.A.O. engine-out case. The current finely streamlined pod greatly reduces drag, and the flush intake makes it difficult for harmful foreign bodies to enter with the engine air. Also, the total-head intake in flight with fuel off is such that no motoring takes place under ram air.

S.N.E.C.M.A.—By far the most important development is the Atar turbojet which originally sprang from B.M.W. designs of the 1940s. S.N.E.C.M.A. have taken the Atar a long way since then, and we know of English engineers best able to judge who have a high regard for this engine. An early Atar 101A was shown fully sectioned, but unfortunately painted in rather a lurid colour scheme. The Atar is very much a utility engine and has a simple axial compressor with seven stages, a sheet-steel annular combustion chamber with 20 burners, huge sheet-steel nozzle guide-vanes, and a single-stage turbine. A variable orifice is fitted, initially of the German needle-valve type, but now employing a pair of eyelids.

A really fine exhibit was the 101F, which must be at least 15ft long, including an immense tailpipe and afterburner. A blanking disc was fitted over the outlet, but a prominent flexible fuel-line could be seen running to multiple re-heat burners. This engine has a great virtue from the supersonic point of view, in that the auxiliaries fit snugly around the compressor to retain a small frontal area. The actual diameter is some 39in and total weight 2,560 lb, of which 600 lb is afterburner. Maximum sea-level power is 8,370 lb, falling to 3,790 at 36,000ft at 620 m.p.h. The 101F may power the Mystère 2, Baroudeur and Vautour.

Although not shown, photographs were available of the Vulcain, which greatly resembles the Sapphire. It was developed by S.N.E.C.M.A. to give 9,920 lb thrust, and ran for 15 hr at this rating two months ago. Two Vulcains will be flight-tested beneath an Armagnac.

At the last Salon the Escopette pulse jet caused a stir, and was found difficult to understand by some. This year's Ecrivisse is guaranteed to baffle all. It is simply a piece of tube bent back along itself, containing a combustion chamber of increased diameter along its mid-portion. There are no moving parts, and the airflow is governed solely by pressures and profiles. Air is induced through the aft-facing intake on top to form an explosive mixture with any liquid fuel continuously fed to the single burner. At the right strength the mixture explodes, the majority passing out through the lower orifice; the internal depression thus created then draws in a fresh charge. The tube resonates at about 60 cyc/sec, and is started with the aid of an air hose and igniter plug. More compact and powerful than the Escopette, the Ecrivisse weighs 13.2 lb and gives 44 lb thrust for the good specific fuel consumption of 1.35.

Shown in photographs was the S.N.E.C.M.A. thrust deviator, which is the first practicable device for turbojets corresponding to the reverse-pitch airscrew. The essentials are a series of channel-section rings mounted in tandem around the jet, and a means for diverging the jet into these rings. The device is being tested in a Vampire—which was demonstrated last weekend—and the jet can be deflected forwards over a proportion of the periphery only, in order to avoid pitching moments or damage to the airframe.

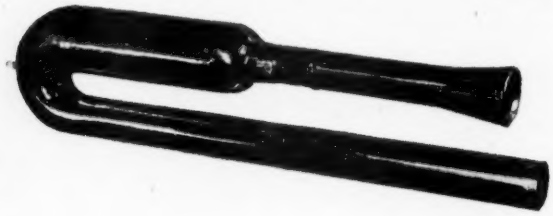
One of the early deviators included a series of variable-incidence vanes in the jet-pipe which, by introducing rotation, directed the jet into the deflecting rings by centrifugal force. The pattern demonstrated at Le Bourget—the Vampire is illustrated on page 57—obtains a similar effect by blowing the jet apart with a stream of compressed air from a nozzle at the jet orifice. Normally, the jet passes through the deflecting rings with little loss.

Among the piston engines S.N.E.C.M.A. have a useful 14-cylinder helicopter power-plant in the 14XH, which develops up to 900 h.p. With the vertical crankshaft, this engine is highly developed and smooth-running.

Not shown were the Hercules 758 (built for the Nord 2501 and shown by S.N.C.A.N.) and the TB-1000 turboprop upon which work appears to have ceased.

S.T.A.L.—Although it more than met the specification of the Royal Swedish Air Force, the Dovern axial turbojet has been abandoned in favour of the Avon—which S.T.A.L. are to build in its place. Nevertheless, an excellent show Dovern II was exhibited, and a fine-looking engine it is. An all-steel, nine-stage compressor is used, the guide vanes of which have reduced incidence at their ends to maintain a relatively thin boundary layer. The pressure ratio is 5.2 : 1, and freedom from surge is claimed; four blow-off valves are, in fact, purely to shorten acceleration time. The nine flame-tubes, of Nimonic 75, are giving well over 500 hr life, and a single turbine is fitted and a fixed-area tailpipe. The Dovern IIA incorporates anti-icing, and the IIB a 30 per cent after-

The burner assembly of the S.F.E.C.M.A.S. S.600 ramjet. (Below) The Ecrivisse is a resonant pulsejet, with both intake and exhaust facing aft.



burner, which is now on test. The show engine was real and could run, and it showed the manner in which Lucas and Rotax have handled the fuel and electrical problems, respectively. Now, Dovern production depends upon the interest attracted.

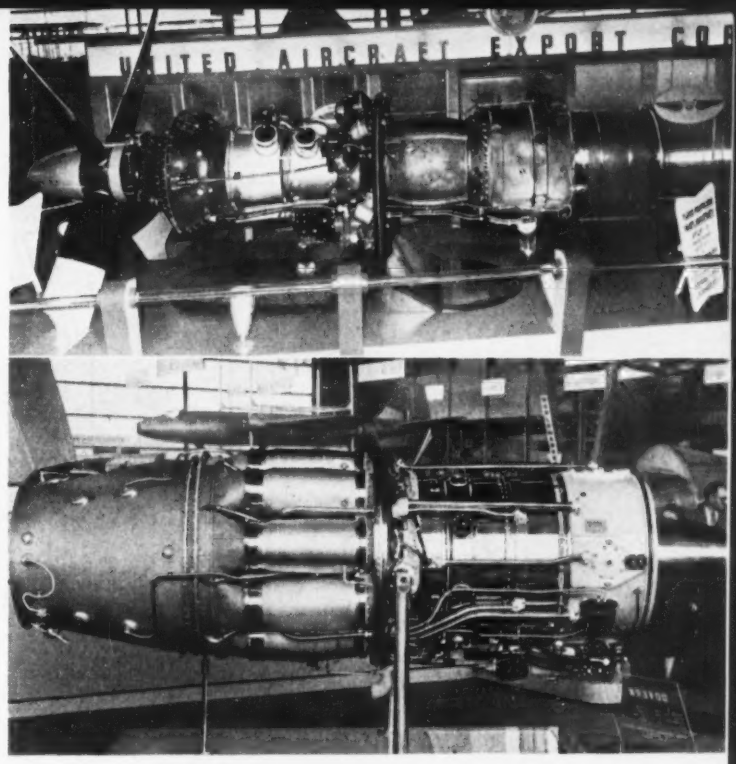
Turboméca.—A completely new type was a 400 h.p. turboprop named Marcadau. This is an Artouste shaft-turbine, on the front of which is mounted a secondary reduction gear for an airscrew. The final shaft is well below the centre line and runs at 2,500 r.p.m. Gearboxes contribute more than half of the 307 lb weight, the basic gas-turbine assembly being that of the Palas turbojet. The Marcadau is scheduled as the power-plant for forward propulsion of the Farfadet convertiplane.

Air turbines driven by bleed from the main engine compressor were also shown, one of them being a cold-air unit, and the other having a quill-shaft for a gearbox. Altogether, the Turboméca stand showed the versatility of M. Szydlowski's staff, and also their ability to produce. Production licences are held by Continental (U.S.A.), Blackburn and General (Great Britain) and also in Jugoslavia.

United Aircraft Corporation.—Just before the Salon opened, the U.S. Navy permitted Pratt and Whitney to show an exhibition PT2F-1 Turbo Wasp, the commercial version of the T34 turboprop. This, probably the most powerful single-shaft unit in the world, was of absorbing interest.

At the front the Hamilton four-blade airscrew has an integral hydraulic control circuit, and the airscrew drive includes a reverse-torque safety switch and a single-cylinder circumferential torquemeter. Around the concentric gearbox is an annular intake, de-iced by hot compressor air. The steel compressor has 13 stages of thin blades, and a steel-drum stator; its diameter is even less than it appears, for there is an additional light-alloy false outer shell, which carries four large, pneumatically controlled blow-off valves. The heavy steel centre-member carries the accessories and four pick-up points, which are large vibration-damping drums toed in toward the c.g. There are no other mounting points.

The cannular combustion chamber has a steel outer case in two halves, into which inject eight dual burners from two rings and two igniter plugs. Fuel flow is sensitive to combustion mass-flow. The three-stage turbine has high-aspect-ratio blades with shrouded tips. Around the narrow waist of the engine are grouped the auxiliaries: fuel controls below, electrics and oil system at the side, and starter and power take-off on top. On the right, in a heavy casing, are a hydraulic pump and multi-disc brake. The pre-production engine shown was fairly bristling with test devices and thermocouples. The T34 has been flying in a B-17 for some years, and will shortly power an R7V-2 Constellation and YKC-124B Globemaster. It gives 5,600 e.s.h.p. at 11,000 r.p.m., although the diameter is but 34in, and the weight 2,564 lb. This is achieved at the expense of heavy fuel consumption, which is quoted as 0.64 lb/e.s.h.p./hr, at full power, and no less than 0.77 in a 60 per cent, sea-level cruise (2,990 e.s.h.p. at 10,250 r.p.m.).



The Pratt and Whitney PT2F-1 (top) is 158in long, but of very small diameter. The STAL Dovern is ready for use, and enquiries were invited.

Also shown was one of the first R 1340-PC-1 Wasps made by Pratt and Whitney, Canada. These 600 h.p. engines are built at Longeuil, Quebec, principally for Harvards and Otters. The example shown was clearly excellently built, but one cannot help reflecting that Wasps have been built for nearly 30 years.

THE AERONAUTICAL BOOKSHELF

"Time Enough to Live," by Dan Brennan. Secker and Warburg, 7 John Street, London, W.C.1. Price 10s 6d.

THIS is a novel about pilots who, having survived one tour of operations with Bomber Command, longed to end their "rest" period of instructing and get back on to Mosquitoes, to convince themselves that they had not lost their nerve. It is often wordy, and there are the inevitable heavy drinking, "realistic" language, and love-making in full, glorious Technicolor.

In consequence, *Time Enough to Live* forms sharp contrast with the picture of a wartime bomber station painted, for example, by Nevil Shute in his delightful novel *Pastoral*. But Dan Brennan himself experienced life at such stations, first as an R.C.A.F. tail gunner and then as a U.S.A.A.F. ball-turret gunner; and one is left with an uneasy feeling that to condemn *his* version would be to condemn many of those whose unremembered achievements and sacrifice brought final victory.

"The Rommel Papers," edited by Capt. B. H. Liddell Hart. Collins, 14 St. James's Place, London, S.W.1. Illustrated. Price 25s.

THERE is plenty of justification for calling Rommel a brilliant tactician; but *The Rommel Papers* do not bear out Capt. Liddell Hart's assertion that he had also a shrewd sense of strategy. He was certainly right in claiming that Malta should have been neutralized by Germany before Crete, and that in June 1944 available Panzer forces should have been so placed that they could move into action speedily against Allied beachheads in Normandy; but he was by no means so right in other strategic matters.

Capt. Liddell Hart is better justified in referring to Rommel as a great military writer. His letters and accounts of his campaigns are lucid, human and very readable. Similarly, there is no disputing that his defeat in North Africa resulted primarily from shortage of supplies when victory was in his grasp.

After Alamein, Rommel had no doubt of the outcome of the war, believing that Germany would have to make peace with the West and so present a united front against Russia.

The Rommel Papers contain striking testimony to Allied air power. There are constant references to the devastating effect of attack by Hurricane "tank-busters" and other aircraft before Alamein, of the efficiency of R.A.F. reconnaissance, the disastrous toll of Axis supply ships taken by Malta-based torpedo-bombers, and the overwhelming Allied air onslaught after D-Day, which literally drove many German troops mad and so thoroughly churned up the ground that tanks could not be driven out of bombed areas. Similar tribute is paid to the support given by the heavy guns of Allied naval forces in the beachhead area.

On the subject of Rommel's loyalty towards his Fuhrer the reader is left in some doubt. In his final letter to Hitler on October 1st, 1944—a fortnight before he was murdered—he wrote "One thought only possesses me constantly, to fight and win for your new Germany." Capt. Liddell Hart writes this off as bluff; but there is little doubt that Rommel was a more complex character than his biographers would have us believe. They stress constantly the humane side of Rommel's character; yet he admits quite cheerfully to shooting a French officer prisoner who refused to climb aboard a German vehicle in 1940. The reader is, therefore, well advised to consider how much of *The Rommel Papers* was written when the author thought German victory merely a matter of time, and how much was written when it seemed he might one day have to answer for his part in the events described.

"Wings of Our Air Force," "Wings of Our Navy," "Jets of the World" and "Arms of Our Fighting Men." All by Major C. B. Colby, C.A.P. Coward-McCann Inc., 121 Sixth Avenue, New York 13, U.S.A. Illustrated. Price $1.

THESE well-produced picture books, intended to show American citizens where their billions of dollars of defence expenditure go, form a useful guide to current equipment of the U.S.A.F., U.S. Navy and U.S. Army.

The Air Force book contains large pictures of 56 different aircraft, including excellent new air-to-air shots of such interesting types as the lifeboat-carrying SB-29 Superfortress, C-122C Avitruc, Northrop X-4 research aircraft, Bell XH-15 helicopter and Service Navion. The captions, although sometimes written in "Americanese" are, in general, accurate and full of useful data.

Wings of Our Navy, with 58 photographs, is even better, with fascinating views of several new or lesser-known types, including a full range of helicopters, early-warning Fortress PB-1W, Avenger transport and AD-4NL Skyraider Night Attacker.

Jets of the World is chiefly notable for some very dubious Russian warplanes, but covers its subject quite well, except for mis-labelling the Mystère as an Ouragon. One glimpse at the fantastic, formidable array of weapons in the Army book—ranging from a sub-machine gun which fires round corners to 14 types of rank and self-propelled gun—should persuade any young American that in any future war he will be much safer in the air!

SERVICE AVIATION

Royal Air Force and Fleet Air Arm News

"Flight" photograph

EARLY ARRIVAL: The first arrivals at Odiham from 2nd T.A.F. for the Royal Review were F/O. R. C. F. Peirse (in cockpit) and F/O. R. Varley on their Venoms.

S. of S.'s Autumn Tour

AT the invitation of the Prime Minister of Australia, Mr. Menzies, the Secretary of State for Air, Lord De L'Isle and Dudley, accompanied by Lady De L'Isle and Dudley, will visit Australia at the end of September.

Lord and Lady De L'Isle and Dudley will fly on to New Zealand, where they have been invited by the Prime Minister, Mr. Holland, to see the finish of the International Air Race from England to Christchurch.

On the outward journey the Secretary of State proposes to visit the Far East Air Force in Malaya and Hongkong.

Meteor Rocket Load

A REPORT from Korea says that the Meteors of No. 77 Squadron, Royal Australian Air Force, are now being loaded with double the normal number of rockets —16 instead of eight.

Used mostly in a ground attack rôle, this adaptation of the double rocket racks makes the Meteors very hard-hitting aircraft, especially so since a full complement of 20-mm cannon ammunition is still carried.

De Havilland Trophy

THE first winners of the de Havilland Flying Trophy were the University of Liverpool Air Squadron (146.7 points) with Manchester second (115.1) and Birmingham (113.3) third. The trophy was presented to S/L. P. J. Farlow, who commands the winning squadron, by Mrs. J. Corby, the wife of Mr. J. C. Corby, general manager of the D.H. factory at Chester.

A silver model of a Chipmunk, the trophy was presented by the company for annual competition between university air squadrons of No. 63 (Western and Welsh) Group.

WARHEADS: Sgt. W. Collings, of No. 77 Squadron, R.A.A.F., now serving in Korea, contemplates the double load of rockets now carried. (See "Meteor Rocket Load".)

R.N.Z A.F. Jets

ORIGINALLY a wartime bomber unit, No. 75 Squadron, Royal New Zealand Air Force, is expected to become a fully operational jet fighter squadron by the end of this year. The commanding officer, S/L. N. H. Bright, was also with the unit during the war. No. 75 will be equipped with D.H. Vampires.

Returned With Thanks

AS Canberra aircraft are now coming steadily into service in Bomber Command, the R.A.F. is now beginning to return to the United States the Washington (B.29) medium bombers, which have for the past three years been in service in Bomber Command. This process will be completed in the next 18 months.

The first Washington aircraft were delivered to Britain in March 1950.

Air Marshal C. E. N. Guest, whose name appears in the half-yearly promotions below. This portrait was not available when the others of the R.A.F. high command (pages 43-45) went to press.

R.A.F. Half-yearly Promotions

THE following half-yearly promotions are announced by the Air Ministry:—

GENERAL DUTIES BRANCH. *Air Vice-Marshal to Air Marshal*—C. E. N. Guest, C.B., C.B.E., A.O.C-in-C. Transport Command, and W. L. Dawson, C.B., C.B.E., Dep. Chief of Staff (Plans) S.H.A.P.E.

Air Commodore to Air Vice-Marshal—D. H. F. Barnett, C.B.E., D.F.C., Sen. British Liaison Officer, Japan.

Group Captain to Air Commodore—H. L. Heath, O.B.E., V. S. Bowling, C.B.E., G. D. Stephenson, C.B.E., A.D.C., R. L. Kippenberger, C.B.E., H. A. V. Hogan, D.F.C. and B. A. Casey, O.B.E.

Wing Commander to Group Captain—L. W. Burgess, D. P. Hanafin, D.F.C., A.F.C., A. J. Mason, D.F.C., K. V. Garside, D.F.C., R. E. Baxter, D.F.C., H. M. Pinfold, A. F. Johnson, D.F.C., W. D. Blackwood, O.B.E., J. A. Field, A.F.C., H. E. Hopkins, D.F.C., A.F.C., G. A. Brown, D.F.C., A. J Shelfoon, A.F.C., J. C. Wells, D.F.C., A. A. Case, O.B.E., R. I. K. Edwards, D.F.C., A.F.C., T. S. Rivett-Carnac, D.S.O., D.F.C., R. T. F. Gates, D.F.C., A.F.C., C. M. M. Grece, D.F.C., N. Slater, O.B.E., A.F.C., A. H. Donaldson, D.S.O., D.F.C., A.F.C., and J. M. Thompson, D.S.O., D.F.C., A.F.C.

Squadron Leader to Wing Commander—R. S. J. Edwards, D.F.C. and A. M. K. Phillips.

(To be continued)

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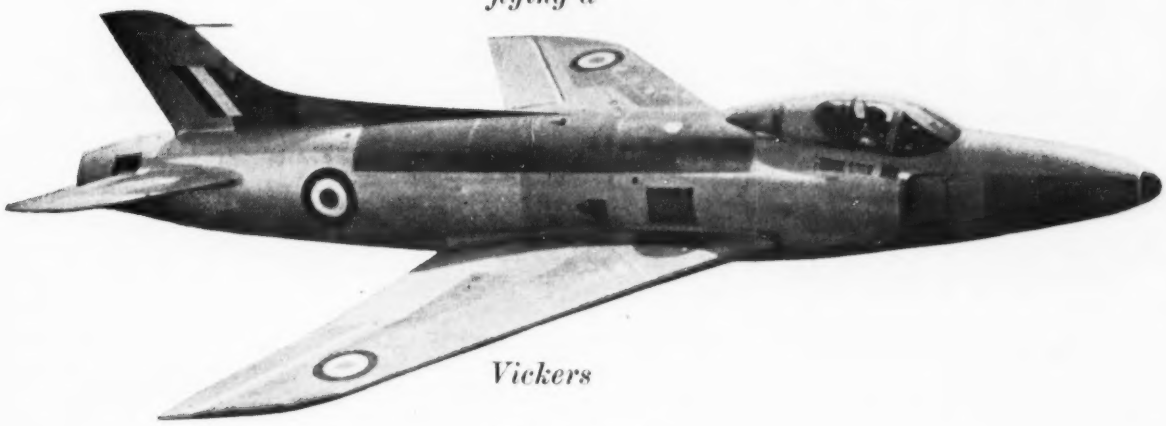

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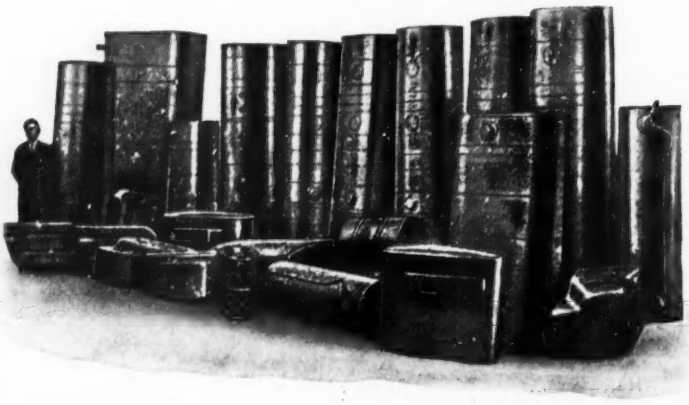

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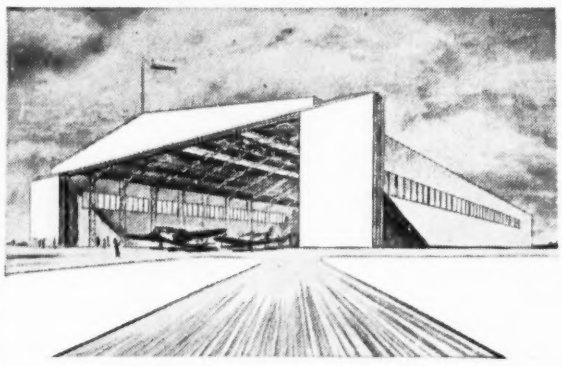

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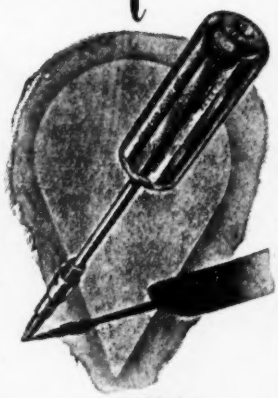

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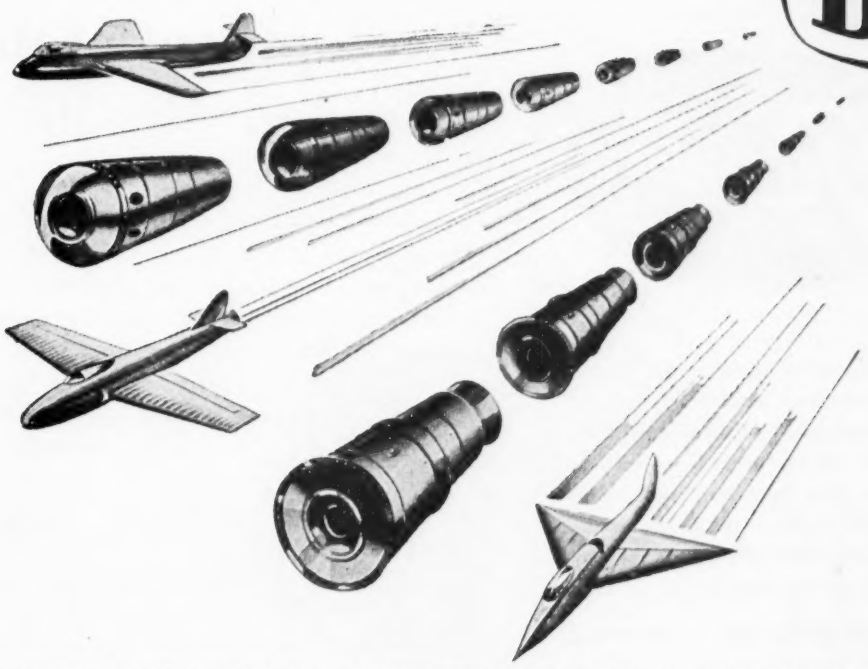

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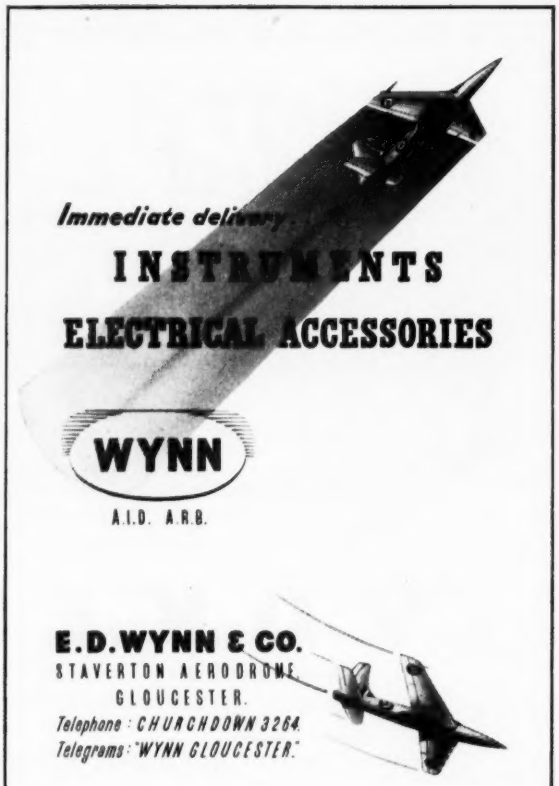

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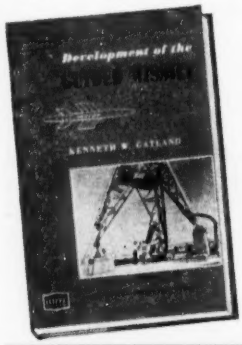

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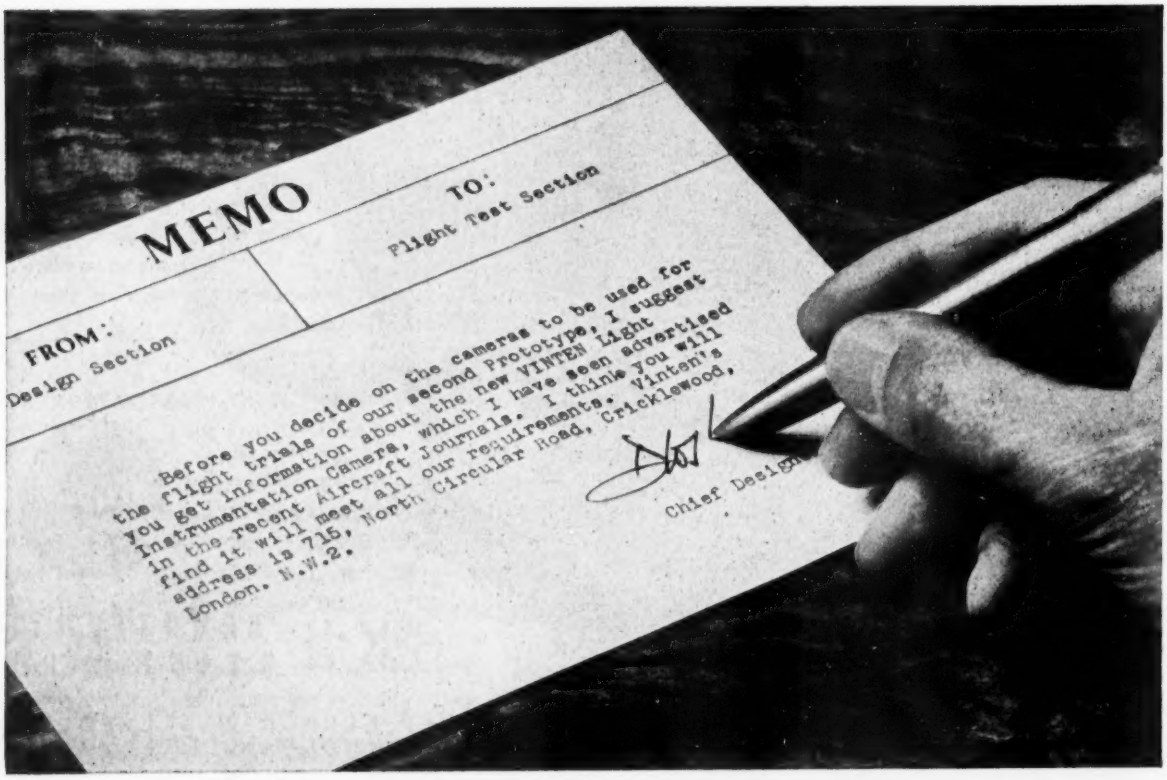
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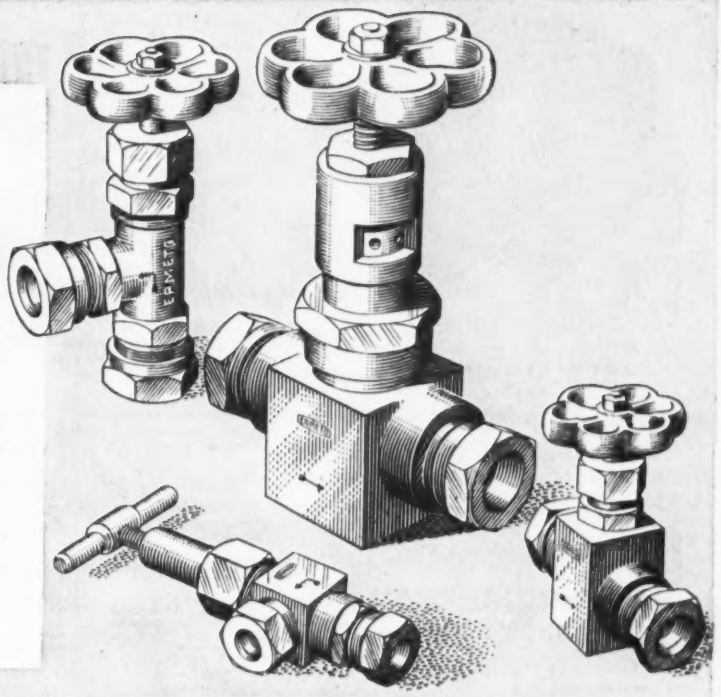

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Accuracy:	±250 feet.	Connections:	Electrical, Plessey Mk. 4 6-pin plug. Pressure ¼" B.S.P./ A.G.S. union or ⅛" diameter pipe connection.
Temperature:	— 40°C to + 70°C.	Control Circuit rating:	5 amps 24 v D.C. Change over contacts.
Vibration:	R.A.E. Technical memo. No. DES. 1. (Central region).		

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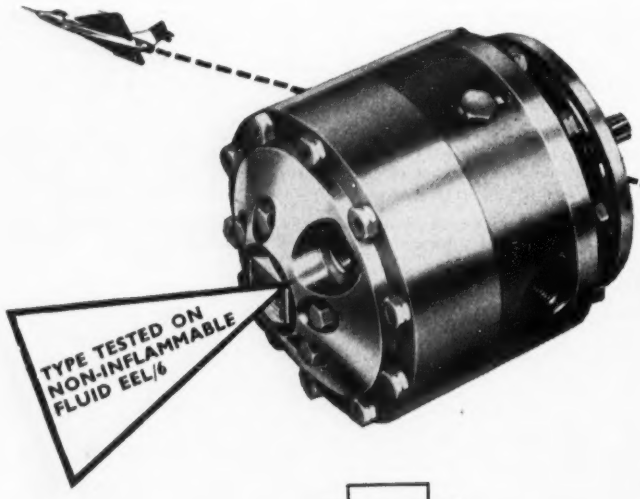

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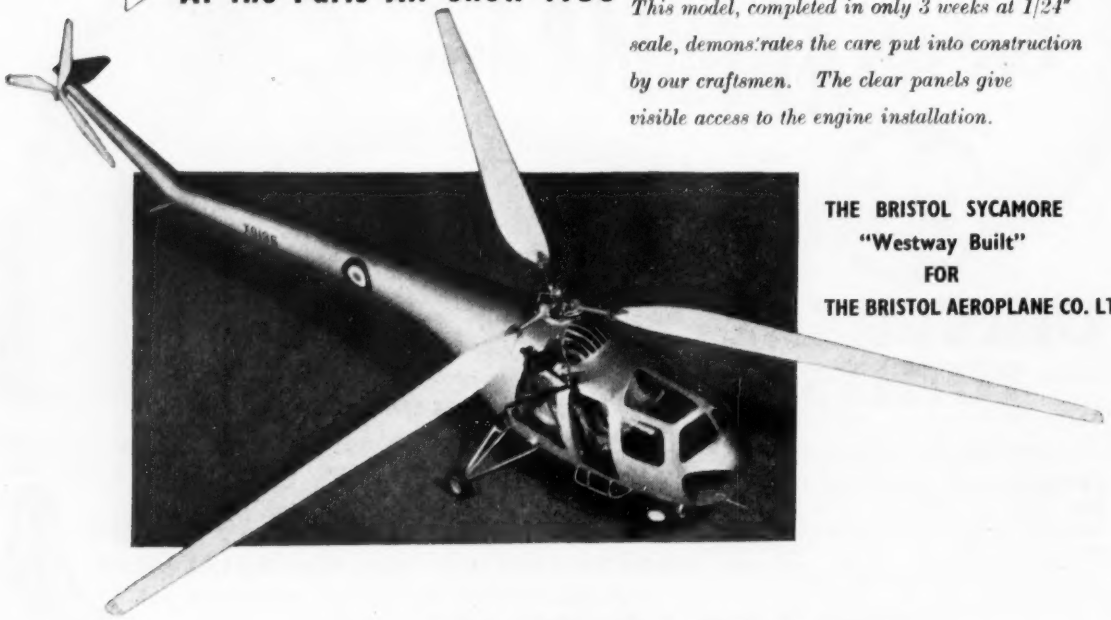

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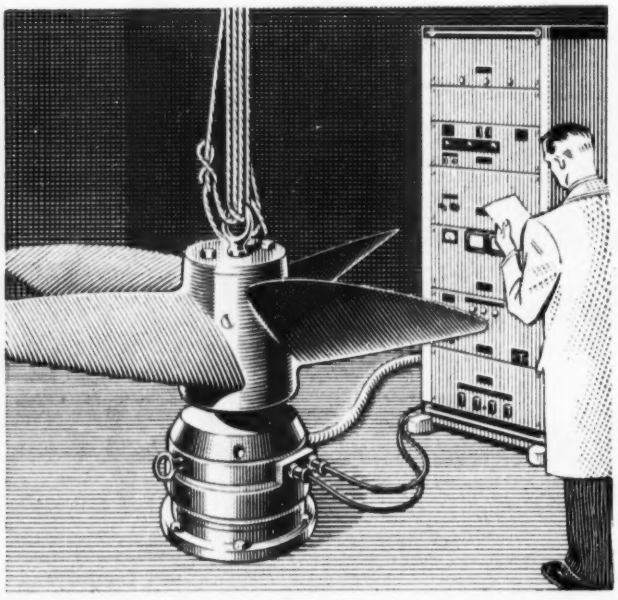

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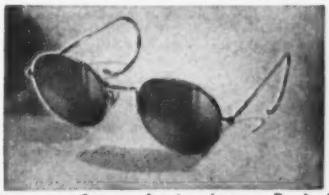

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PUBLIC ANNOUNCEMENTS

AIR TRANSPORT ADVISORY COUNCIL

THE Air Transport Advisory Council give notice that they have received the undermentioned applications to operate scheduled air services:—

Application No. 198. From Air Charter Ltd., of 15 Great Cumberland Place, W.1, for a Colonial Coach service, initially with York aircraft and later with Bristol Mk.31E aircraft, for the carriage of passengers and supplementary freight, at a return fare of £80, with a 10 per cent rebate for service personnel in uniform, between London (Stansted) and Nicosia (Cyprus) with an intermediate traffic stop at Malta, at an initial frequency of one service weekly, increasing with demand up to one service daily during the period from October 1st, 1953, to September 30th, 1960.

Application No. 199. From Eagle Aviation Ltd., of 29 Clarges Street, W.1, for a Colonial Coach service, initially with Viking aircraft, for the carriage of passengers and supplementary freight, at a return fare of £75, between London (Blackbushe) and Nicosia, with an intermediate traffic stop at Malta, at a maximum frequency of 52 services yearly, to be operated throughout the year and at a rate of up to three return flights weekly from April 1st to November 15th each year during a ten-year period from two months after the date of approval of the service.

THESE applications will be considered by the Council under the Terms of Reference issued to them by the Minister of Civil Aviation on July 30th, 1952. Any representations or objections with regard to these applications must be made in writing, stating the reasons, and must reach the Council within 14 days of the date of this advertisement, addressed to the Secretary, Air Transport Advisory Council, 9 Buckingham Gate, London S.W.1, from whom further details of the applications may be obtained. When an objection is made to an application by another air transport company on the grounds that they are applying to operate the route or part of route in question, their application, if not already submitted to the Council, must reach them within the period allowed for the making of representations or objections. [9828

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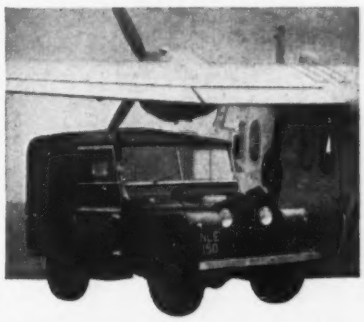

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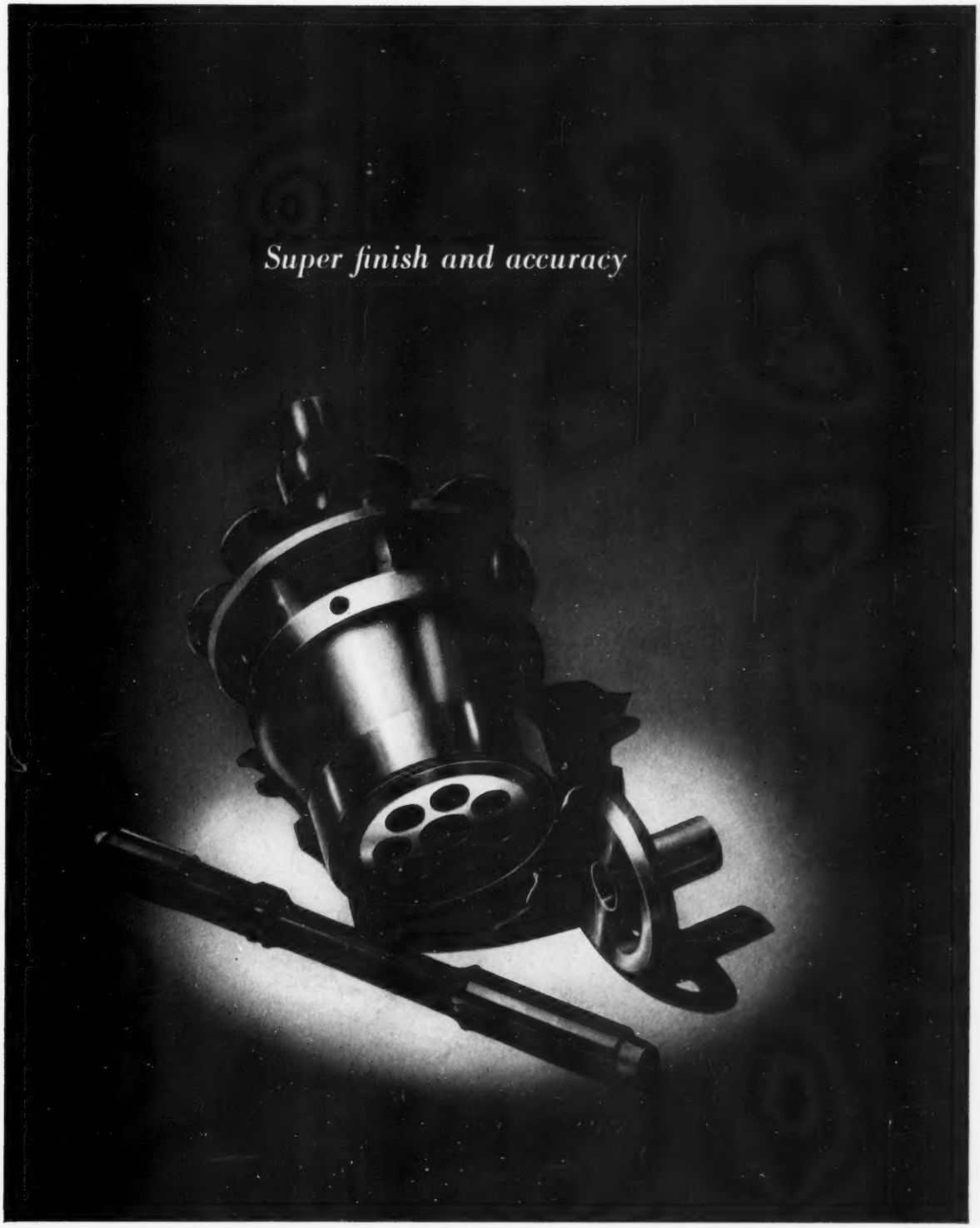

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